PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04Q 7/20, 7/22, 7/00 — A1

(11) International Publication Number: **WO 99/48308**

(43) International Publication Date: 23 September 1999 (23.09.99)

(21) International Application Number: PCT/US99/04638

(22) *International Filing Date:* 2 March 1999 (02.03.99)

(30) Priority Data:
09/044,373 18 March 1998 (18.03.98) US

(71) Applicant: AERIS COMMUNICATIONS, INC. [US/US]; Suite 201, 1245 South Winchester Boulevard, San Jose, CA 95128 (US).

(72) Inventor: LADUE, Christoph, K.; 912 3rd Street, Santa Cruz, CA 95060 (US).

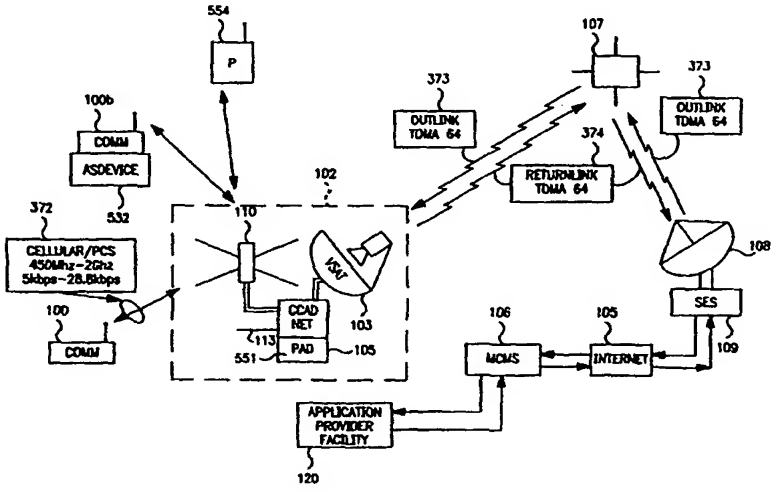
(74) Agents: CALDWELL, Gregory, D. et al.; Blakely, Sokoloff, Taylor & Zafman, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025-1026 (US).

(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: METHOD AND APPARATUS FOR COMMUNICATING APPLICATION SPECIFIC DATA OVER WIRELESS COMMUNICATION NETWORKS

(57) Abstract



Communicating messages between a cellular mobile radio communicator (100) and a central monitoring station (120) over a communication network that includes a voice channel and a control channel (372). The voice channel conveys data messages and the control channel conveys control messages that manage access to and use of the voice channel. The communicator obtains a message comprising application data, and encodes the message in a sequence of digits associated with a control message to create an encoded message. A remote feature control request is encoded in the sequence of digits associated with the control message to invoke the forwarding of the sequence of digits, including the encoded message, by a telecommunications switching center upon detecting the remote feature control request. The control message and associated sequence of digits are transmitted from the communicator to a base station over the control channel, by passing the voice channel, and then transmitted from the base station to the telecommunications switching center via a satellite communication channel. The telecommunications switching center detects the remote feature control request and forwards the remote feature control request and the encoded message over a communications over a communications channel to the central monitoring station in response to detecting the remote feature control request. The encoded message is decoded at the central monitoring station to retrieve the application specific data.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

METHOD AND APPARATUS FOR COMMUNICATING APPLICATION SPECIFIC DATA OVER WIRELESS COMMUNICATION NETWORKS

This application is a continuation-in-part of application no. 08/591,035, filed January 25, 1996, and further claims the benefit of U.S. provisional application no. 60/041,678, filed March 26, 1997.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention broadly relates to wireless data communications systems such as cellular, personal communications systems (PCS), hybrid cellular and satellite personal communication networks (PCN), cordless telephone, broadband cable television, broadcast satellite, very small aperture technology (VSAT), ultra small aperture technology (USAT) private satellite DAMA based mesh node networks, time shared TDM/TDMA VSAT networks, permanently assigned multiple access (PAMA) TDMA, direct broadcast satellites (DBS) and mobile satellite systems. The present invention also relates to nanocell, microcell, minicell, picocell and macrocell base sites, base transceivers stations (BTS), that are fully integrated with bi-directional Ka, Ku, C band, and L Band communications satellite transceiver earth stations and Inmarsat, teledesic LEO and Iridium LEO mobile satellites, mobile earth stations (MES), main hub-teleport satellite earth stations.

Description of the Related Art

There are wireless communications systems known in the art today that support multi-formatted data protocols and radio frequency conversion. In fact, the seminal concepts that spawned cellular, PCS, GSM and mobile satellite communications networks originally were from conventional public switch telephone networks (PSTN) for; inter central office switch; inter exchange

ANI/wink protocols, and person to person access via directory number routing and information. The invention of 800 number services, centralized calling card exchange data bases and other such means and methods, gave rise to today's cellular, PCS and mobile satellite communications technology; that enable automatic roaming, multi standard communications apparatus designs, bi directional mobile switching centers, home location registers, SS7 networks, X.25 networks, ISDN networks, asynchronous transfer mode (ATM) networks and others. These ground breaking concepts are expressed today in contemporary mobile switching protocols, satellite ground station protocols, switched satellite protocols (SSP) and base station or base transceiver station protocols; that utilize today's cutting edge mesh node topology and star topology architecture.

The present invention also draws upon these fundamental concepts to create the next revolution in bi directional application specific data communications. The present invention further draws upon these core concepts; and thus creates a quantum leap towards a complete paradigm shift, that enables total; multi mode and or mutli communications standard flexibility in and for mobile and stationary application specific wireless data communications. The present invention merges multiple cellular, PCS, communication satellite, internet world wide web (WWW), and broadband fiber optic networks, private and public SS7 networks, wideband wireless data networks such as Metrocom high density low mobility mesh node networks, and others.

There have been other attempts to create a limited hybrid network. For example Siemens Corporation envisions a PCN network that combines asynchronous transfer mode (ATM) data technology with small PCN switches

that communicate with one another via geo stationary satellites, while user handsets will not directly communicate with any satellites. This system teaches that use of satellite communication schemes with terrestrial base sites and cellular type handsets is feasible. This particular system supports voice, fax, telex and limited data and is expensive, and overly complicated. User handset to base site data rates are also quite low. Additionally, the Siemens PCN system does not support low cost application specific data systems. The present invention provides a complete data communications network (DCN) that combines cellular and PCS analog and digital control channel data application data (CCAD), apparatuses, protocols and algorithms with TDM/TDMA VSAT/USAT satellite communication network architecture there is also provided a complete integration of cordless telephone technology, broadband cable television networks, broadband telephony networks, thus creating a complete CCAD-NET-DCN Network.

For example, very small aperture technology (VSAT) and ultra small aperture technology (USAT) satellite networks were originally designed to support fixed-stationary services. These services include closed business networks that support limited voice, fax, text, video, point of sale, security monitoring, utility monitoring, environmental monitoring and supervisory control and data acquisition (SCADA) telemetry services. VSAT and USAT networks also support branch/ATM banking, credit card verification and other low data time shared services. Also VSAT and USAT was created to enable small terminal or hand held mobile satellite services. VSAT and USAT operate in UHF frequencies, L-band frequencies, X band military frequencies, and Ku and Ka band frequencies. However, there are no satellites or satellite networks that

support mobile and stationary data terminal services. Current K band satellite do not support mobile services because of the inherent limits of mobile terminal antenna signal gain characteristics and other such problems such as satellite power and capacity.

The present invention provides the missing low cost mobile, by high data rate link by combining UHF and K band VSAT and USAT fixed point, time shared TDM/TDMA satellite terminals and networks, and/or demand assigned multiple access (DAMA) mesh node VSAT/USAT satellite terminals and networks, with existing cellular and PCS analog and digital cellular control channels; both physically and logically defined, digital access channels, authentication channels, and broadcast control channels (BCCH) that operate in; AMPS, NAMPS, TACS, JTACS, ETACS, NMT-900, NMT-450, GSM-900, GSM-1800, GSM-1900, IS-95 CDMA, IS-136 TDMA, 1900Mhz CDMA, 1900Mhz TDMA, 1900Mhz GSM TDMA, SMR-dispatch, Enhanced Specialized Mobile Radio ESMR-NEXTELL, Cordless telephone systems such as DECT, CT1-CT2+, PHS and DCS-1800, Metrocom mesh node high density, low mobility systems and other currently operating and planned cellular and PCS standards. The present invention combines VSAT, USAT and DBS fixed point network data terminal apparatuses and protocols with a specialized data only control channel mini-base site apparatuses and protocols that will operate within normal cellular, PCS and ESMR air interface, PSTN signaling network standards. In fact the present inventions means, methods and apparatuses create a complete world wide CCAD-NET-DCS network that fully supports a variable length packet data based application specific mobile and stationary communications system, that is cost effective and ubiquitous worldwide, while using existing

wireless communications and wireline; copper and fiber optics communications infrastructure.

BRIEF SUMMARY OF THE INVENTION

Accordingly, a method and apparatus that provides for bi directional data communications in or for a specialized control channel application data network, data communications system (CCAD-NET-DCS) is provided, where a terrestrial based cellular and PCS application specific digital or analog control channel data packet, or digital access channel data packet, or authentication channel data packet, or signaling channel data packet, containing application specific coded data information bits, is transmitted from a data only, or hybrid voice and data mobile or stationary communications apparatus to a specially combined control channel only cellular and or PCS multi sector, or single sector, macro, mini, micro, pico, or nano base site, that is completely integrated via hardware, firmware and software means with a satellite based VSAT/USAT fixed data communication terminal converts cellular and PCS reverse control channel, digital access channel, authentication channel, and signaling channel protocols into VSAT or USAT analog frequency division multiplex (FDM) or digital time division multiple access (TDMA) or code division multiple access (CDMA) data packet and packet bundle protocols that operate on normal satellite transponder channels or satellite transponder guard bands and or authentication bands, and is fully integrated with a very small aperture technology (VSAT) fixed point satellite terminal via hardware and software means, that in turn transmits via uplink, said converted application specific data packet or packet bundles to a designated C band, K band or L band geo stationary, or high earth orbit satellite

(HEO), a medium earth orbit satellite (MEO), or low earth orbit satellite (LEO). Said satellite receives, processes and transmits data packet or packet bundles to a specially integrated satellite earth station (SES) and combined teleport-data management master central monitoring station (MCMS). Said data packet or packet bundle is processed and forwarded to an application specific facilitator such as a trucking company, via VSAT terminals and satellite, and landline or public switch telephone network (PSTN) means. The facilitator analyses the application data packet and determines that an application specific instruction or action message must be sent back to the application communicator that originally sent the GPS or other application specific data packet. The application specific facilitator sends instructional data packet to the MCMS via VSAT satellite, landline or PSTN means. The MCMS-Teleport receives the packet, analyses said packet, and prepares a forward application specific data packet to be transmitted from the VSAT satellite earth station or application specific teleport. The CCAD compatible SES then transmits an application specific instruction packet or packet bundle to the satellite transponder on a specific frequency assigned FDM/analog and/or time division multiple access (TDMA) time shared single channel per carrier (SCPC) or multiple carrier per transponder channel (MCPC), or guard band or authentication band. The satellite re transmits said instruction packet or packet bundle to the designated control channel application data satellite CCAD-NET-DCS base site that is currently serving the designated mobile or stationary communicator. Said base site carries no voice traffic and converts received VSAT data packet or packet bundle protocol into forward analog control channel, or forward digital access channel, or forward digital control channel, or forward authentication channel, or forward signaling channel, or forward paging channel, or forward broadcast channel protocol, or forward

digital control channel (DCCH), and transmits said data packet to the designated application specific mobile or stationary communicator via selected control channels that are fully integrated with an application specific device.

Furthermore, this novel usage of terrestrial cellular and PCS, analog and digital control channels, digital access channels, authentication channels, set up channels, signaling channels, that are fully integrated via hardware, firmware and software means with fixed point and mobile UHF, C-band, Ku band, Ka band and L band VSAT and USAT UHF, C band, Ku band, Ka band, L band and X band satellite terminal protocols, and assigned satellite transponder channels, guard bands, authentication band networks; that create a new wireless world wide web of low cost mobile and stationary application specific data communication capabilities that enables such application specific data services as; two way paging, motor vehicle fleet management, motor vehicle anti-theft and recovery, motor vehicle diagnostics, asset tracking, package tracking, container tracking, inventory security and control, personnel tracking, police and military personnel management, home arrest, keep aways, child protection, teen watch, medical alert, vital sign monitoring, outpatient tracking, wireless gambling, utility electrical and gas meter reading, oil and gas well head monitoring, security system reporting, vending machine inventory status and system diagnostics snap shot reporting, point-of-sales, Branch/ATM, credit card verification, casino and off site wireless gambling, e-mail access and transfer, internet access, broadcast messaging, video file transfer, J-peg/M-peg, broadband video services, wireless computer file transfer, SCADA and others.

Broadly, the disclosed means and method enables a seamless application specific data only worldwide CCAD-NET-DCS network, that is in fact a virtual multi path data communications network that operates seamlessly within the standardized air interface protocols, Signaling System Seven (SS7) PSTN signaling protocols, internet socket connection protocols, broadband fiber optic based data protocols, of all known cellular and PCS analog and digital control channel, digital access channel, authentication channel, set up channel, signaling channel protocols; wideband data protocols, broadband fiber optic data protocols, without causing disruption to the conventional cellular, PCS, wideband data, internet, or multi service broadband fiber optic network, and fully complies with such standards as interim standards; IS-41B, IS-41C, IS-553, IS-54B, IS-136, IS-104, IS-95, IS-661, and 2Ghz PCS. Operational platforms; AMPS, NAMPS, DAMPS, TACS, ETACS, JTACS, NMT-450, NMT-900, Global System for Mobile (GSM), DCS-1800, DCS-1900, DCS-900, 1900 MHz CDMA, 1900 MHz TDMA, 1900 MHz GSM-TDMA, Nextell-GSM-TDMA, wideband data mesh node networks, and cordless telephone standards JCT, CTO, CT1, CT2, CT2+, PHS DCS-1800, and DECT. Additionally, the present invention fully complies with International Telecommunication Union (ITU), INMARSAT, COMSAT and other wireless and wireline communications standard conventions and associations.

Furthermore, the disclosed method and embodied apparatus operate adjacent to, and completely within, currently operating cellular, PCS, internet, multi service broadband fiber optic networks and satellite networks without causing disruption to conventional cellular, PCS, Broadband, internet and satellite voice and data communications. In fact the present invention does not impact

conventional cellular, PCS mobile switching centers (MSC), conventional base sites, conventional cable head ends, inter exchange network nodes; copper based or fiber optic based, in that the CCAD-NET-DCS base site operates in normal cellular and PCS control channel frequencies, assigned VSAT/USAT satellite frequencies, wideband data frequencies, cordless telephone frequencies, and essentially standard data format protocols. Since cellular and PCS is based upon a frequency reuse pattern, the control channel part of the CCAD-NET-DCS base site follows the same standard and protocol scheme. In fact, the CCAD-NET-DCS base site can be co-located with and installed on conventional cellular and PCS base site antenna tower structures. This same scheme integrates into wideband data mesh node topology networks, in that, assigned wideband data frequencies, and data protocols, do not conflict with cellular, PCS and satellite frequencies and data protocols. Further, that the CCAD-NET-DCS base site can also be cellular, and PCS control channel compatible, satellite and wideband data compatible. In that, said base site is configured to operate simultaneously in a star topology high mobility-low density node; cellular, PCS network, and TDMA/VSAT network and, a mesh topology low mobility-high density node; wideband data network, and a DAMA/VSAT network.

The CCAD-NET-DCS base site sector antennas, data management and processing module, and fully integrated VSAT/USAT terminal can be installed without interfering with its voice and control channel frequencies, and without impacting any data link; 56 kbps, T1, line-of-sight microwave resources that are interfaced with the host mobile switching center. CCAD-NET-DCS operates without using any capacity resources of the host cellular network, while at the same time providing additional data service capacity to the host cellular or PCS

carriers network. However, the CCAD-NET-DCS MCMS-Teleport and base site enables a completely independent data communications network that uses control channel, digital access channel, authentication channel, and signaling channel frequencies that have been assigned to various cellular and PCS carriers. Therefore, the CCAD-NET-DCS network needs no Federal Communications Commission (F.C.C.) frequency allocations, and can operate without impunity in cooperation with previously licensed cellular, PCS, wideband data, and cordless telephone (TDD) carrier air interface protocols. In fact, the present invention can be utilized to greatly increase the application specific data capacity, and fully optimize any existing terrestrial cellular, PCS, internet and broadband fiber optic network.

Air interface frequency reuse is not a new concept. And multi mode communications apparatus configurations are an established practice in the art. The only way to increase capacity of a given cellular and PCS terrestrial network, is to add access channels, control channels and voice channels, this is typically enabled by adding base sites, or by increasing the capacity of base sites. Conventional cellular and PCS macro base sites are expensive, and require a great deal of physical land space. Additionally these macro base sites require a T1 carrier, or line-of-site microwave links. Conventional cellular and PCS mini base sites require a T1 carrier or line of site microwave. The only way to increase the number of times the frequency band or channel capacity can be reused is to decrease the size of the base sites irradiated cell waveform footprint. This is one principle behind the placement of CCAD-NET-DCS base sites.

The present inventions cellular and PCS components of the macro, mini, micro, pico and portable nano base sites are designed to provide from one omni directional to three directional analog or digital control channel, or digital access channel, or digital signaling channel, or authentication channel, or duplex DCCH channel, or control and signaling related traffic channel sector transceiver cells that transmit from five to 100 watts of irradiated power (EIRP), with an effective transmission range of 2 to 30 kilometer radius. The VSAT/USAT satellite terminal components of the CCAD-NET-DCS base site provide the direct access to the present inventions MCMS-Teleport via C Band, Ku, Ka, or L band satellite transponders. The present inventions base site configurations therefore provide a highly flexible and low cost of providing new, and or additional application specific data services to existing cellular, PCS and wideband data host networks without impacting switching to signaling capacity. Additionally, the present invention can act as a stand alone data communications network, and be installed where at present there is no cellular or PCS or wideband application specific data services. The present inventions CCAD-NET-DCS base site cellular, PCS and wideband analog and digital frequencies can be partitioned in order not to interfere with existing and operating cellular and PCS base sites and wideband data nodes and power managed for a particular physical installation. Therefore the present invention provides the means and method of providing an unlimited amount of application specific data service capacity. The CCAD-NET-DCS bases site also provides an entirely new range of forward and reverse analog and digital control channel, digital access channel, digital authentication channel, digital control channel DCCH, signaling channel, broadcast control channel (BCCH), forward paging channel, GSM 51 frame TDMA signaling channel variable burst application specific air interface messaging data protocols, that provide a full

range of true throughput data rates from 4800bps to 64 Kbps for mobile and stationary application specific data services.

The present invention provides a two way text messaging apparatus that utilizes the inventions unique cellular and PCS, analog and digital control channel, digital access channel, digital signaling channel, broadcast control channel (BCCH), and digital control channel (DCCH) application specific bi directional data protocols. In fact the present inventions two way paging, and two way text messaging can be utilized with internet WEB TV apparatuses, broadband cable television closed captioning text protocols and apparatuses, and other video text services offered via broadband cable television and telephony systems. In one variation, a caller can page a person using one of the present inventions two way paging device. The forward page is sent via normal broadcast paging networks, the forward page is received, and the apparatus user simply scrolls the menu for the appropriate reply. He selects the reply, presses the send button on the two way paging device. The response is sent via the present inventions analog and or digital control channel application specific protocols, arrives at the present inventions MCMS Teleport Hub, is then routed to a host broadband network, whereby the response message is broadcast over the host broadband network that happens to be same cable television network the caller subscribes too. The message is sent in the form of a closed captioned or video text messaging protocol, that appears on the callers television screen. The message reads, " I cannot call right now, but will see you tonight." There are many television monitors that offer video text, closed captioning options, and WEB TV internet access, that will easily enable these types of application specific devices. This same two way paging, or two way messaging video text

response can be sent directly over the internet to any point of presence (POP), such a business computer network and other such means and methods. Additionally, this same response message can be sent via the caller I.D. exchange that operates in current wireline telecommunications networks. For example, the pager caller can have a caller I.D. display equipped phone, that not only displays the directory number of the person placing a call, the phone can also display the message " I cannot call right now, but will see you tonight." This means and method does not impact telephone network capacity, nor does it require any modifications over the host telephone network. Other broadband applications include utilizing special cable television side band frequencies, and pay per view authorization code packets for two text messaging transport and display.

The present invention also provides the novel implementation of SS7 based IS-41C messaging over satellite space segment channels therefore completely combining satellite technology and terrestrial based IS-41C/SS7 protocols, whereby CCAD-NET-DCS base sites become SS7 POP nodes, in the same way that cellular and PCS switches, home location registers (HLR), visitor location registers (VLR), switch points (SP), signaling transfer points (STP), and signaling connection control points (SCCP); that utilize Signaling System Seven (SS7) Blue Book for U.S. implementation (56kbps), and International (64kbps) China Red and China Blue operational standards. The SS7 specification consists of seven standards; ANSI T1.110 through ANSI T1.116. They respectively cover the system general information, the Message Transfer Part (MTP), the Signaling Connection Control Part, (SCCP) the Transaction Capabilities Application Part (TCAP), the SS7 Network Monitoring and Measurements (OA & Measurements), and the Operations, Maintenance and Administration Part (OA & M procedures).

It is an object of the present invention to provide fully SS7 signaling from the CCAD-NET-DCS base site to the MCMS-Teleport, and other points of presence (POP) on the landline inter switch and internode SS7 network, utilizing a combination of public and private SS7 networks, and satellite space segment IS-41C/SS7 data protocol pathways. The present invention therefore creates the first low cost holographic, terrestrial based and space segment based, control channel application specific data communications network; a complete revolutionary network based on essentially conventional technology, that is in total compliance with existing cellular, PCS and satellite based operating standards. It is another object of the present invention to provide CCAD-NET-DCS base site nodes and MCMS-Teleport hub network access on the internet world wide web (WWW).

Additionally, the satellite frequencies; 3.7 to 4.2 GHz for C band, 11 to 14.5 GHz for Ku band, 17 GHz to 31 GHz for Ku band, Military/deep space X band 7.1 to 12.2 GHz, Q band 43 to 50 GHz, S band 2.1 to 6.4 GHz, ISL-V band 54 to 64 GHz, and ISL laser optical bands, and others operate in much higher frequencies than cellular and PCS 450 MHz to 2 GHz frequencies, and Metrocom frequencies. Therefore, no frequency waveform or data protocol conflict is envisioned. By using the satellite networks to transmit and receive data to and from a CCAD-NET-DCS base site, there are no conventional cellular and PCS MSC switch resources used. In fact, the present inventions means and methodologies completely bypass any and all cellular and PCS MSCs. The present inventions combined satellite teleport and MCMS hub act as a star topology or star switched, or DAMA mesh based application specific data switching, routing and data distribution architecture medium. Therefore,

absolutely no capacity impact on adjacent cellular and PCS networks is envisioned or needed.

Communicator means and methods are also disclosed, there is also provided a specialized data packet multi-mode CCAD-NET-DCS mobile and stationary communications apparatus. This apparatus can operate within a normal cellular, PCS and wideband data network, by utilizing conventional forward and reverse analog and digital control channels, digital access channels, authentication channels, signaling channels, by utilizing a special multi-mode remote access application messaging (RAAM) packets that will operate on conventional cellular and PCS reverse analog and digital control channels, and CCAD-NET-DCS reverse analog and digital control channels. Additionally, these apparatuses will detect and respond to special overhead, forward application specific forward messaging, and global action forward protocols, transmitted by the present inventions CCAD-NET-DCS base sites. The CCAD-NET-DCS satellite uplink and downlink can be maintained on a continuous permanently assigned multiple access (PAMA) TDM/TDMA, or configured for demand assigned multiple access (DAMA), or time shared TDM/TDMA VSAT/USAT C band or K band satellite access. For example demand assigned multiple access (DAMA) techniques often are used with single channel per carrier (SCPC) analog FM earth station transmissions. Instead of dedicating a satellite transponder carrier frequency solely to SCPC/FM transmissions, SCPC carriers are assigned on demand by a DAMA master control station contained within the MCMS Teleport. This permits more economical use of the transponder capacity. This saves space segment time, and MCMS Teleport resource capacity. Furthermore, valuable satellite transponder bandwidth demands are event driven. CCAD-NET-

DCS network cost are kept to a minimum. Such prior art VSAT and USAT systems as DAMA-DAVSAT utilize on Demand Assigned Multiple Access (DAMA). The result of a DAMA type of CCAD-NET-DCS data transmission, also enables a dramatic reduction in space segment satellite transponder time. Time division multiple access (TDMA) satellite and earth station techniques permit a multitude of CCAD-NET-DCS base sites to share one transponder. The MCMS Teleport Hub assigns every CCAD-NET-DCS base site in the network a specific time within every minute to access the assigned transponder channel. All of these transmission formats heretofore described can use either analog or digital signals.

The communicator apparatus can also operate on wideband data networks such as the Metrocom mesh node wideband data; high density/low mobility networks that support high volumes of wireless computer file transfer between a personal computer or personal digital assistant (PDA). The present inventions communications apparatus, and CCAD-NET-DCS mini-hub can support the bi directional transfer of large computer file transfer that require large bandwidth and data throughput rates in order to transfer graphic files, and other data files that require a great deal of radio signal bandwidth, stability, and robust error correction. The present invention provides a completely innovative means and method of providing a mutli mode communicator apparatus that supports high mobility and low density, cellular, PCS network control channel data communications while simultaneously supporting the combined advantage of data communication within a Metrocom mesh node high density/low mobility data communications network.

The present invention provides specialized forward and reverse analog and digital control channel data communications protocols. The present invention's reverse RAAM packet operate on conventional cellular and PCS network control channels configured for that network. Additionally, the present invention's CCAD-NET-DCS base site transmits specialized forward analog or digital control channel overhead packets; such as specialized global action messages, overhead application specific communicator instruction/command filler messages, application specific command messages, protocol capability indicators (PCI), heart beat VSAT alignment words, specialized local control forward messages, specialized forward overhead application specific pages, network queues, VSAT/USAT mini-hub, and terminal remote programming from cellular CCAD compatible hand held communicators, plus other forward data packet protocols that operate seamlessly in currently established analog and digital cellular and PCS geographic service areas (GSA), metropolitan subscriber areas (MSA), metropolitan transaction areas (MTA), and rural subscriber areas (RSA). In fact, the present invention's forward messaging protocol schemes in no way adversely impact, or disturb conventional cellular and PCS mobile user unit and base site voice or control channel wave forms, mobile switching center procedures, conventional forward or reverse control channel data protocols. In particular, the present inventions forward analog and digital control protocols are not detectable by conventional cellular mobile and stationary mobile phones and other devices. Even if the CCAD-NET-DCS base site is placed in close proximity to a conventional cellular or PCS base site. Conventional cellular and PCS communicators will not scan, and burst a conventional control channel packet to the CCAD-NET-DCS control channels. Conversely, the CCAD-NET-DCS mobile or stationary communicator will not scan and burst its specialized CCAD-

NET-DCS reverse analog or digital control channel application data packet to a conventional cellular or PCS base site, if the CCAD-NET-DCS communicator detects the specialized forward message that contains the PCS field it will scan and burst its Extended RAAM (ERAAM) data packets to the CCAD-NET-DCS base site only. However, if the currently serving cellular or PCS network is configured for the present inventions specialized ERAAM packet, and there are no CCAD-NET-DCS base sites operating in close proximity, the currently serving network will accept the normal RAAM packet, and relay it to the MCMS via special switch translation table and remote feature access means under IS-41B and IS-41C protocols and procedures.

Accordingly, there is provided a method for control application data communications in or for a wireless communications network where a remote feature access operation utilizes switch means and Signaling System Seven (SS7) network means to receive, analyze, and relay said RAAM, ERAAM or EXRAAM packet to the present inventions MCMS Teleport Hub utilizing standard IS-41B, and IS-41C signaling protocols and procedures, completely embodied in the present inventions MCMS-Teleport, CCAD-NET-DCS base site, and mobile and stationary applications specific multi-mode communications apparatus . It is envisioned that a variant of the CCAD-NET-DCS base site is configured as a portable base site that is battery or solar powered, and can be hand carried and placed into service in a matter of minutes. It is further envisioned that the CCAD-NET-DCS portable base site can be used for remote mobile and stationary communications operations focused on commercial, police and military applications, such as personnel, troop movement coordination and motor vehicle tracking and management.

A primary object of the present invention is to provide a method and apparatus for use on wireless terrestrial networks, such as cellular, PCS and fixed point and mobile communications satellite networks, where the CCAD-NET-DCS virtual network overlay allows for increased capacity, performance, flexibility and function, without impacting the normal or conventional operation of these existing and planned networks.

It is an object of the invention to provide a specialized multi-mode RAAM, ERAAM and EXRAAM data packets that operate via the present invention's CCAD-NET-DCS base site and the MCMS-Teleport hub, additionally normal RAAM, and ERAAM packets operate in existing cellular and PCS networks that are configured for IS-41 type inter switch and network node messages, and remote feature access operations. These multi-mode packets will operate on every known analog and digital cellular and PCS network platform and air interface protocol known in the art today.

It is an object of the invention to provide a multi-mode application specific communications apparatus that will enable mobile and stationary application devices to communicate with the present inventions MCMS-Teleport Hub while using any one or combinations thereof that are widely known cellular and PCS network standards specified in such Telephone Industry Association (TIA) documents as; IS-553, IS-41, IS-54B, IS-136, IS-95, IS-104, IS-637, IS-661,GSM TDMA, and wireless wideband data ;mesh node high density low mobility wireless data communications networks. These standards also include all international digital and analog cellular and PCS network platforms, cordless

telephone standards, broadband data/television, and air interface standards specified in the European Telecommunications Society (ETS)

It is an object of the invention to provide both a means and method for Internet World Wide Web (WWW) access over cellular, PCS, wideband data, fixed point satellite networks and mobile satellite networks utilizing CCAD-NET-DCS base site, communicator apparatuses and MCMS-Teleport hub system. There is provided a CCAD-NET-DCS nano cell base site that operates within the confines of homes, businesses and large commercial facilities, utilizing satellite USAT nano eighteen inch/.75 meter satellite antennas, combined with cellular, and PCS, analog and digital control channel, digital access channel, authentication channel, and signaling channel data protocols. The present invention also provides for unique derivative designs of these protocols, whereby half duplex and full duplex messaging can be provided for in building application specific two way messaging and data communications. There is also provided a personal computer based mini hub that manages the transmission and reception of application specific messages, and broadcast paging messages. The CCAD-NET-DCS nano cell base site and combined mini hub create a microcosm data communications system, that combines the unique air interface protocols of the present invention with SS7/IS-41 based signaling over space segment, X.25 frame relay protocols and internet WWW socket protocols over public and private data communications networks.

There is also provided a mesh node DAMA subnetwork gateway, that supports complete multi protocol/mode compatibility and communication; within specialized cellular, and PCS application specific analog and digital control

channel protocols, DAMA and TDMA VSAT based networks; combined with wideband Metrocom high density low mobility networks. That, the present invention is the first to create and combine a fully mobile, low density applications specific short packet control channel based communications medium with a high density low mobility network, whereby complete co system integration is achieved, via an application specific communications apparatus, an MCMS Teleport Hub system, a CCAD-NET-DCS multi-mode base site, CCAD-NET-DCS gateway, mini hub base site, a specialized broadband cable television network, and a broadband multi system network.

There is provided a novel use of the generically defined internet based mass consumer oriented WEB TV system. In that the present invention provides integrates a WEB TV terminal into its means and methods, thus creating a CCAD-NET-WEB TV base site configuration; that provides and displays; global positioning (GPS) based services such as motor vehicle tracking, motor vehicle anti theft, personnel locations, child location, teen watch, FedEx package tracking, and other related services. Whereas; there is further provided a graphic image menu display that enables a user to locate a motor vehicle, that has a CCAD-NET-DCS GPS location communicator that periodically transmits GPS longitude and latitude coordinants, via the present inventions cellular, PCS, wideband data, and satellites data communications protocols. There is provided a centralized geographic mapping display hardware and software means that enables a CCAD-NET WEB TV user to access the inventions MCMS Teleport Hub, via a CCAD-NET WEB TV equipped television monitor, CCAD-NET-WEB TV base site, CCAD-NET-DCS communicator, or a CCAD-NET-WEB TV equipped personal digital assistant (PDA); and retrieve a graphic display snap

shot still image, of the immediate location of a land based motor vehicle, person or object; an aircraft, or water born craft. This snap shot is actually a still image of a moving map display, that depicts the movement of persons, vehicles and objects, in a given city, county, or other geographic location. This snap shot is graphically displayed on the inventions CCAD-NET-WEB TV configured television monitor, communicator LCD display, or PDA or personal computer multi color video display.

It is another object of the present invention to provide the means and apparatus to create a CCAD-Network, that further utilizes broadband cable television networks; fiber optic back bones for transporting CCAD-NET-DCS network application specific data over; narrow band, broadband and wideband fiber optic networks. There is provided a CCAD-NET cable television/broadband CATV/MATV base site that communicates with a CCAD-NET-DCS communicator, and a specialized CCAD-NET personal digital assistant (PDA), that enables multi protocol and multi mode communications via international cordless telephone means and methods integrated with the present inventions control channel, SS7 network, internet, and satellite narrowband remote access application (RAAM) data; via control channel data, physically and logically defined; variable burst remote access application data (VBRAAM/VBURST) via; specially selected traffic, control, voice channels, wideband data channels, wideband data; packet/file based on wideband mesh node topology networks, that typically enable high density, low mobility voice and data communications. There is provided a television set top CCAD-NET-DCS gateway nano base site; with multi mode air interface capabilities; for stationary and pedestrian communications. The CCAD-NET-DCS gateway nano base site provides a

choice of one of many international cordless telephone air interface standards on the front end, and direct broadband cable television network with fiber optic data transport as backbone/backend. This fiber optic backbone supports CCAD RAAM (MICROBURST) short packet data, CCAD-VBRAAM/VBURST variable burst packet data and CCAD-NET-DCS wideband data (MACROBURST) modes that support large computer file, graphic file, and video file transfers over wideband mesh node topology networks, broadband cable television networks, master antenna television (MATV), community access television (CATV), and other multi-mode fiber optic networks that support telecommunications, cable television broadcasting, and broadband data communications.

Additional object and advantages of the present invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate a preferred embodiment of the invention and, together with a general description given below and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention.

Fig. 1 is a logical block diagram showing the preferred embodiment of the CCAD-NET-DCS reverse messaging protocol according to the invention.

Fig. 2 is a logical block diagram showing the preferred embodiment of the CCAD-NET-DCS forward messaging protocol according to the invention.

Fig. 3 is a schematic diagram showing the functional CCAD-NET-DCS generic base site system, according to the invention.

Fig. 4 is a schematic diagram showing the functional CCAD-NET-DCS system in a large worldwide macrocosmic virtual network overlay, according to the invention.

Fig. 5 is a schematic diagram of the CCAD-NET-DCS MCMS-Teleport subsystems functional data management elements and generic multi protocol base site, according to the invention.

Fig. 6 is a schematic diagram of the CCAD-NET-DCS multi-utility network, according to the invention.

Fig. 7 is a block diagram of the RAAM packet with C-word according to the invention.

Fig. 8 is a schematic diagram of CCAD-NET-DCS communicators transmitting specialized CCAD-NET-DCS EXRAAM reverse analog control

channel data packets, and converting said data packets to satellite network compatible messaging, according to the invention.

Fig. 9 is a schematic diagram of CCAD-NET-DCS communicator receiving specialized generic analog control channel forward messaging data packets, that have been converted from satellite data communications protocols, according to the invention.

Fig. 10 is block diagram of VSAT/USAT TDMA and AISS7 protocols, according to the invention.

Fig. 11 is block diagram of generic cellular forward analog control channel application specific filler messages, according to the invention.

Fig. 12 is block diagram of generic cellular forward analog global action messages, according to the invention.

Fig. 13 is a block diagram of a specialized ERAAM packet with C-word removed, and another H word attached, according to the invention.

Fig. 14 is a frontal view illustration of the handheld CCAD-NET-DCS GPS based, two way messaging personnel management communications apparatus, according to the invention.

Fig. 15 is a schematic of the portable CCAD-NET-DCS base site according to the invention.

Fig. 16 is an illustration of the mobile CCAD-NET-DCS base site according to the invention.

Fig. 17 is a block diagram of the portable and mobile CCAD-NET-DCS base site automatic cellular and PCS carrier and channel detect protocol, according to the invention.

Fig. 18 is an illustration of the CCAD-NET-DCS cellular, cordless telephone and broadband/WEB TV multi function nano multi function base site and PDA, according to the invention.

Fig. 19 is a schematic diagram of the CCAD-NET-DCS MCMS Teleport Hub system and other essential network elements, according to the invention.

Fig. 20 is an illustration of the CCAD-NET-DCS base site as VSAT only SS7 gateway-node, according to the invention.

Fig. 21 is a schematic of the CCAD-NET-DCS base site terminal as cellular or PCS SS7 gateway-node, according to the invention.

Fig. 22, is a side view illustration of the CCAD-NET-DCS GPS based, two way messaging personal management communications apparatus, according to the invention.

Fig. 23, depicts the CCAD-NET-DCS multi platform mesh node micro network, according to the invention.

Fig. 24, depicts the CCAD-NET-DCS multi platform mesh node micro network multi pathway backbone, according to the invention.

Fig. 25, depicts the CCAD-NET-DCS multi protocol PDA, according to the invention.

Fig. 26, depicts the CCAD-NET-DCS TV base site television set as messaging medium, according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to the present preferred embodiments of the invention illustrated in the accompanying drawings. In describing the preferred embodiments and applications of the present invention, specific terminology is employed for the sake of clarity. However, the invention is not intended to be limited to the specific terminology so selected, and it is understood that each specific element includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

Accordingly, there is provided a method for bi-directional cellular, PCS, control channel application data and wideband multi-protocol data for internet based communications network (CCAD-NET-DCS), in or for a digital or analog based wireless cellular, PCS, wideband and satellite communications network

where the application specific data capabilities of cellular and PCS forward and reverse; analog and digital control channels, digital traffic channels, digital access channels, authentication channels, forward paging channels, signaling channels, fast associated control channels, slow associated control channels, IS-136 TDMA digital control channels (DCCH), IS-95 CDMA forward and reverse access messaging capsules, upbanded TDMA/CDMA digital control channels, PCS broadcast control channels (BCCH), GSM 51 multi-frame signaling channels, and others; are completely integrated via a specialized MCMS Teleport data management hub; that controls and communicates with a unique low density, highly mobile application CCAD-NET-DCS base site node, and or control and communicates with a unique high density, non mobile application CCAD-NET-DCS multi platform base site node, and or communicates and controls with a specialized CCAD-NET-DCS base site node that is capable of supporting mobile and stationary cellular and PCS specialized application specific control channel communications and specialized non mobile wideband data computer data file transfer communications. The present invention can operate within the means and methods of DAMA mesh topological internode communication schemes, and or TDMA star topological internode and master hub communications scheme; that utilizes novel wireline inter signaling protocols, novel broadband copper and fiber optic based network protocols, novel cellular, PCS, Wideband Data air interface protocols, and novel space segment data protocols created by uniquely designed packet assemblers/dissassembler modules located at CCAD-derivative satellite hub terminal, VSAT/Cell terminal node, and CCAD-SAT cell base site; whereby hardware, firmware and software means provide; synchronous and asynchronous data protocols, and protocol conversion procedures, with fixed point and mobile satellite; HEO, MEO, LEO, polar orbit, inclined orbit, geosynchronous, bent

pipe, transponder, satellite switched data (SSD), DAMA protocols, PAMA circuit protocols, CDMA spread spectrum multiple access (SSMA) and amplified analog and digital data protocols that utilize satellite 2.5 ms guard bands, authentication channels, signaling channels, inter satellite link (ISL) Ka band and optical band data protocols, and uplink and downlink PAMA, or time shared transponder channels.

Additionally, there is provided a complete integration of cellular, PCS and satellite application specific, control channel application data services with a specialized space segment derivative of U.S. domestic IS-41C/SS7 56 Kbps, and International 64Kbps SS7 land based bi-directional messaging, for public and private domestic and international worldwide networks. The present invention therefore enables direct landline, internet and or air interface access to application provider facilities, whom manage a multitude of application specific services.

Referring to Fig. 1, the CCAD-NET-DCS communicator 100 scans the cellular, PCS and Wideband data overhead/forward channel frequencies assigned to each sector and or transceiver radio of the multi sector array CCAD-NET-DCS base site that broadcast continuous or intermittent analog or digital overhead filler and application specific forward data, for analog busy/idle status (BIS) or digital TDMA or CDMA timing or coding access and training bits, and bursts the specialized application specific microburst; enhanced remote access application message (ERAAM) to the strongest sector channel frequency, being broadcast from one of the multiple directional or omni-directional sector channel antenna arrays that are directly connected to the specialized cellular or PCS analog or digital radio transceivers, depicted here as sector 1, 122, sector 2, 123 and sector

3, 124. Additionally, The base site can also be equipped with a wideband data transceiver 121, and antenna array. These components allow the present inventions application specific communicators to transmit and receive large bandwidth computer data file transfers, or macroburst data. These data files are packetized within the same means and methods that the cellular and PCS application specific control channel data packets are processed. Additionally, the cellular and or PCS sector transceivers can be configured to accept any known and planned cellular or PCS analog or digital air interface standard. These same sector transceivers can also operate with any known U.S. domestic and International assigned terrestrial cellular or PCS radio frequency. Once the ERAAM packet 532 as depicted in Fig. 13 is received by the selected sector transceiver, it is sent via hardware and software means to the CCAD-NET-DCS base site multi-processing system 117 as depicted in Fig. 8. This particular ERAAM packet is designed to operate in accord with the American Mobile Phone (AMPS), Total Access Communication System (TACS) analog cellular standard. Referring to Fig. 1, the multi-processor input 144 receives the ERAAM, attached a unique sector radio transceiver identification number. Multiple ERAAM packets are multiplexed 146, in a time division multiple (TDM) arrival scheme. A wide range of TDM multiple access processes are widely known in the art, so therefore no further explanation is deemed necessary. The multi-processor creates and stores ERAAM packet protocol details and statistics 147, the packet analog words, or digital time slots are counted 148 and a stored record is created 149, that is accessed remotely via landline modem, or via VSAT satellite link. Next, the received ERAAM cellular or PCS analog or digital packets are converted via firmware and software means to very small aperture terminal/technology (VSAT) or ultra small aperture terminal/technology (USAT)

air interface/space segment time division multiple access (TDMA) protocol 150, with a selected data rate from 300Kbps to 64Kbps. Next, the multiprocessor appends the previously extracted and prepared unique sector transceiver I.D. number to the prepared VSAT/USAT TDMA packet 151. The CCAD-SAT-DDCN base site software further appends a unique base site identification number 152 to the user data slot of the VSAT/USAT TDMA data packet 190 as depicted in Fig. 10. Referring to Fig. 1, the multiprocessor, based on its current multi-sector packet load, can create a multi packet batch or bundle 153 via CCAD-NET-DCS base site embedded firmware and software means. For example, the AMPS version of the CCAD-NET-DCS ERAAM data packet as depicted in Fig. 13, contains 336 total bits of, authentication data, communications unit identification data, word counters, application specific data, application class data and parity. Furthermore, this particular analog packet is structured around a 48 bit, seven word block hamming coded analog data format. To save satellite space segment capacity, there is provided data packet bundling or batching. Referring to Fig. 10, the maximum VSAT/USAT TDMA packet size is 520 Bytes 161, providing 13.4 TDMA slots 165, with a data throughput rate of 64 Kbps 163, as. This TDMA packet 190 provides a maximum capacity of 4160 binary bits of data contained within the information field 534. Therefore 11 eight word, 336 bit ERAAM data packets can be bundled into one 520 byte VSAT/USAT TDMA message, 80 bits for a base site I.D. with eight, four bit numbers, and six two four bit sector I.D. numbers, that can be arranged in various patterns based on what sector received and processed which packet. Referring to Fig. 1, if a multi-word bundled packet is going to be transmitted in a single heretofore mentioned VSAT/USAT TDMA packet, yes 156 send packet bundle, and if no 155, than a single ERAAM data packet is sent 157, from the

multiprocessor to the VSAT High Power Amplifier 154, at a lower data rate, and a smaller byte capacity size. The HPA 154 transmits the single packet or packet bundle to the satellite 159. The satellite relays the packet or packet bundle to the MCMS Teleport 160, where it is appropriately processed, and then relayed to the appropriate application provider facility FAC 120.

Referring to Fig. 2, once the application provider facility 120, receives the single packet or packet bundle, it is processed in accord with the operational parameters established that particular application such as; two way paging, global positioning based fleet management, point-of-sales, asset tracking, utility meter reading, wide band data computer file transfer, et. al.. The application provider, or facilitator prepares via firmware, software and hardware means, a forward application specific message to be transmitted; point to point, or point to omni point; a application device update command, a polling of status message, a trigger event, an alpha numeric message to be read by a user, a global broadcast of application specific control events, specific user forward message that it is transmitted in an interleaved pattern with conventional overhead filler messages, and many other message types. When the facilitator 120 sends a forward message with request, it is sent via socket connection to the internet, a dial up to the internet, or a closed LAN/WAN network, or by the present inventions VSAT/USAT internet/SS7 gateway, to the MCMS Teleport 300. Once the MCMS Teleport receives the forward message, it is scanned, the user or users are identified, and the current serving CCAD-NET-DCS base site is identified. Next, the MCMS data processing terminals attach an individual CCAD-NET-DCS base site node I.D. global, cluster, and node code to the forward packet 301. Another available option is to create a complete CCAD-NET-DCS world wide network,

regional network, or a geographic service area, rural or urban service area; global broadcast message. This message is sent to all VSAT/USAT CCAD-NET-DCS base sites, currently serving a particular application specific class, of CCAD-NET-DCS communicators, that are currently operating. Another variation of this network wide message, is that it can contain anti fraud information such as CCAD-NET-DCS base site network global challenge orders, CAVE type algorithms SSD utilized in IS-54B, IS-136, and S-95 communicator maintenance programs, diagnostic programs, base site diagnostics, VSAT/USAT terminal diagnostics and software upgrades. Conversely, these same anti fraud codes and routines can be applied to single communicators. Referring to Fig. 2, the MCMS Teleport can send a single forward packet to the CCAD-NET-DCS satellite earth station (SES) 302, or 303, the MCMS Teleport sends a forward packet bundle to the CCAD-NET-DCS SES 304. This packet bundle can contain multiple packets for one communicator, or for an application class of communicators, or a group of communicators from various classes that need forward messages transmitted simultaneously. The CCAD-NET-DCS SES, that is an integral component of the MCMS Teleport, transmits single packet or packet bundle on the uplink/ outlink to the currently serving geosynchronous satellite and selected transponder 305. The geo synchronous satellite supports multiple data protocols, data rates, provides traveling wave tube amplification (TWTA) and multiple frequencies, and receives the single packet or packet bundle on uplink 306 also known as a outlink. Upon reception of packet or packet bundle, the satellite typically amplifies the received radio signal, and routes the signal with the included packet to packet bundle to the downlink transponder 307. The downlink transponder essentially retransmits the outlink signal with the contained packet or packet bundle, on a designated downlink transponder frequency, that transmits the

packet or packet bundle to a specific CCAD-NET-DCS base site, or to a group of base sites in a point to omni point broadcast means and method 308. The CCAD-NET-DCS base site, also known as the CCAD-NET-Earth Station (CES) receives the single packet or packet bundle 309. Once the CES receives the packet and or packet bundle, the CES processes the received data and converts the packet or packet bundle into cellular and or PCS application specific data, maintenance data, forward messaging, download programming, and other data into multiword, or multi frame slot packet form 310. Then, the CES processes and prepares a single or multiple packet transmission 311. The CES firmware and software means selects one or all sectors available; sector 1 122, sector 2 123, sector 3 124 at the designated CES, and transmits the single packet or multiple packets to designated application specific; multiple communicators, or a single communicator 312. The communicator 100 can be connected one of a multiple of application specific devices.

Referring to Fig. 3, an application specific communicator 100b is directly connected via software, firmware and hardware means to application specific device (ASDEVICE) 532. This ASDEVICE can be a utility electrical, gas meter, a security panel installed in a home or business, a motor vehicle anti theft security system, a GPS based fleet management system, or the communicator is designed as a self contained application specific device 100 that has no external device attached, such as a cellular or PCS based two way paging communicator, or a GPS personal management communicator, or a debit prepay cellular/PCS handset, or a GPS based home arrest communicator, or a personal digital assistant (PDA) based communicator. The application specific communicator 100 can operate within a wide range of analog and digital cellular and PCS standards and

assigned frequencies from 450 MHz to the 2 GHz range 372. There is provided an application specific personal digital assistant (PDA) 554, that transmits, receives and processes microburst ERAAM and EXRAAM application specific data packets, variable burst remote access application messaging (VBURST) packets within conventional cellular, PCS and wide band data networks, or via the inventions specialized digital control and traffic channels that an integral component of the CCAD-NET-DCS base site. The same PDA 554 can also transmit and receive wideband computer data files, large data bit graphic files, video image file transfers. Referring to Fig. 25, the CCAD-NET-DCS PDA 554 is configured to perform many multi mode functions. In this particular example, the PDA 554 has a split personality, part cellular or PCS handset 589x it has all the conventional controls and display 592. However the entire unit opens up in clamshell fashion and reveals that the back of the handset 589y encloses a proportionately large liquid crystal display (LCD) 593. The other half or bottom of the PDA 554x contains controls that perform the same functions as a computer keyboard with additional duplicate cellular or PCS handset controls. The functions are well known to those whom practice the art, therefore a detailed description is deemed necessary. The LCD display 593, reveals some menu driven choices that the PDA can perform upon man machine interface intervention or by automatically derived operations via firmware and software programming means, exponentially expressed within automatically controlled command and status response events. For example this particular PDA is able to send and receive Microburst control channel data messaging 561, and extended microburst messaging system (EMS) 562, also known as variable burst remote access application message (VBURST). This PDA can also send and receive wideband data messages 563, also known as Macroburst Application Specific

(MAS) messaging system. This PDA is enabled to send and receive CCAD-NET TV interface messages and service related instructions; such the inventions CCAD-NET-WEB TV GPS location services, and CCAD-NET-WEB two way messaging and two way paging/messaging services 587.

Referring to Fig. 3, the CCAD-NET-DCS base site system or CCAD-Earth-Station (CES) 102, can be solar powered with a solar electric photo voltaic panel 113, providing the power source. This combined cellular, PCS, wideband data and satellite base site, acts as an interface between, cellular and PCS digital and analog control channels, specialized application specific control messaging protocols, specialized wideband data protocols and fixed satellite terminal, or earth station technology; a geo synchronous satellite, or satellites 107, an SS7 private or public network, and or the internet world wide web 105, the present inventions MCMS Teleport Hub 106, and various application provider facilities 120. The satellite 107, the base site system 102, and the CCAD NET satellite hub ground station 109, support outlink 373 and return link 374 data rates of 64 Kbps in some configurations, and 155Mbps in other personal communication network inter switching bi directional space segment interconnections. For example, the CCAD-NET-DCS VSAT portion of the base site is in TDMA mode, it is communicating with the present inventions MCMS Teleport Hub 106 on a continuous basis, in that it continuously receives a shared outlink 374 via the satellite 107. As many as several hundred CCAD-NET-DCS base sites 102 can share the same outlink. The CCAD-NET-DCS base site in TDMA mode, periodically transmits a returnlink 374 carrier in a bursty means and method in pre determined time slots. Returnlink carrier transmissions can be received exclusively by a single CCAD-NET-DCS base site, or shared by many base sties,

depending on the current traffic load, or load demand. Returnlinks shared by multiple CCAD-NET-DCS base sites are accessed using TDMA. Opportunities for base site transmissions are divided into specific time intervals and referred to as "slots." Referring to Fig. 10, specific slot protocol patterns are fundamental to returnlink slot assignment. Its purpose is to coordinate all slots in a frame 538; that is, to tell the CCAD-NET-DCS base site in what slots and what types of messages they may transmit. In this example, one slot or timing increment 539, shown here as 10, contain up to 520 bytes of data 161 in a single burst packet 190, transmitted at a data throughput rate of 64 KBPS, 163, with 13.4 slots as the capacity limits in a frame, as shown in the data rate table 160. Therefore, 13 CCAD-NET-DCS bases sites can simultaneously burst a 520 byte message simultaneously, in one TDMA frame. Slot configuration plan information is contained in a consolidated format being utilized by the returnlink data packet protocol. A specific and unique collection of slots 538 which occur on a repeating basis is referred to as a channel and is defined by a starting slot number 539 and a constant increment. Slots are numbered consecutively 538, starting with zero and progressing to a predetermined maximum. This maximum capacity derived from a combination, of CCAD-NET-DCS base site data rates, determined by control, and wideband channel transceiver or sector capacity. Other determining factors depend upon exactly which cellular or PCS analog or digital control protocol is used and the physically or logically defined limits of control, traffic and wideband data channels that carry each application specific data transfer event. As many as 500 slots may occur the period of one returnlink frame 537. A high capacity CCAD-NET-DCS base site can be assigned from one to seven channels on the same returnlink. MCMS Teleport Hub size also determines the peak data throughput rate of a given event, and how many channels it can access or utilizes

per event. Some application specific events such as point to multiple protocol point delivery of group class messages require more over all system capacity than do point to point message event deliveries. The CCAD-NET-DCS returnlink data packet is comprised of an application data field 534, the returnlink overhead field (ROH) 158, unique packet identification field (UW), equal to 36 bits 535, the packet preamble 159, that has a capacity of 252 bits, and the guard band 536 the fills the space between each slot. A returnlink can be divided into contention, reserved, and test channels. The increment for all channels on a returnlink are identical. All slots are a member of one TDMA VSAT channel. In addition, a greater number of CCAD-NET-DCS base sites, can occupy one TDMA frame on the return link channel, when lower data throughput rates are need in proportion to the particular packet size needs on a per event basis.

Referring to Fig. 3, the VSAT portion of the CCAD-NET-DCS base site transmits data packet bursts, just long enough to transmit a 40 to 520 byte packet or packet bundle at the configured returnlink 374 data rate. Extended VSAT based messages can be segmented by optional CCAD-NET-DCS base site software and hardware means, that enable bundled messages and data files to be transmitted in a multiple burst format, in the same way as bursty control channel, digital access channel, authentication channel, signaling channel, and broadcast control channel protocols. Therefore the present invention is the first application specific data network that creates a total cellular and PCS short packet bi directional bursty packet system; combined with a space segment bursty time shared packet data system; thus creating a complete, low cost short packet application specific data system. The returnlink carrier packet format can be

configured to apply SS7/IS-41 type bi directional messaging to space segment links, in the same means and method that it is applied to land based networks.

The CCAD-NET-DCS hub satellite earth station (SES) 109, uses a larger 3.7 -7.0 meter antenna 108 with layer SSPA power amplifiers or traveling wave tube (TWT) high power amplifiers (HPA). With appropriate sized amplifiers and antenna, the CCAD-NET-DCS hub can support up to 64 subnetworks with up to 64 outbound and 384 in bound carriers. This system is totally flexible, and can be expanded when needed. Outlink carriers and returnlink carriers can be configured to support 128 KBPS with larger aperture hub throughput rates, thus enabling larger data file transfers. Referring to Fig. 3, and Fig. 19. In Fig. 3, the outlink carrier 373 delivers CCAD-NET-DCS outlink packets from the MCMS Teleport Hub 106 to a group of CCAD-NET-DCS base sites 516, 517, 518, 519, and 375. Each of these base sites represent different configurations, that in fact deliver different packet sizes and data rates per application specific data packet event, based upon the bi directional control channel application data packet sizes and data rates needed, based upon cellular and PCS transceiver sector sizes, so stated in each of the CCAD-NET-DCS base site total capacity and functional variations depicted here. The outlink packet messages can contain application specific data, CCAD-NET-DCS network management data, test data or software download information. Every packet contains a three byte global, cluster and CCAD-NET-DCS base site SS7/IS-41 type address. This capcode type address which is recognized by one or more CCAD-NET-DCS base sites contained within a given geographical region that is also defined as a subnetwork. All application specific messages, such action messages are packet multiplexed together in bundles on the outlink carrier and CCAD-NET-DCS base site selects only those messages

addressed to it, or an application or configuration group of which it is a member. Outlinks can be operated from 19.2 Kbps to 128 Kbps. Outlinks are processed in the MCMS Teleport Hub 106 by outlink modulators (OM) 553. In addition to outbound application specific data packets, outlinks carry wideband data packets and play a critical role in the distribution of network timing to each CCAD-NET-DCS base site. The clock timing recovered from the outlink is used by the CCAD-NET-DCS base site to count information bits within a slot period. Individual slot boundaries can be determined by counting a constant number of bit incremented times. To improve return link message transport reliability, the burst demodulator (BD) 552 software keeps track of reserved returnlink slots and for whom they are reserved. This same outlink clock timing generation is used by each CCAD-NET-DCS base site system, to control the cellular and PCS forward control channel, digital access channel, authentication channel, signaling channel, GSM 51 multiframe protocol and other control channel analog and digitally defined, for example in Fig. 9, the block code timing of an AMPS IS-553 40 bit multi word protocol, designed for FOCC channel channels is controlled by the outlink sub frame carrier timing clock increments 544. In Fig. 8, the reverse control channel messaging is also fundamentally timed and synchronized by the outlink carrier timing clock increment 544, in an indirect way. For example, when a CCAD-NET-DCS application communicator 100c, 100d, and 100e, scans and burst an analog or digitally defined data packet, it depends upon the synchronization of the analog overhead stream 330 as depicted in Fig. 9, since the overhead stream is timed and synchronized by the outlink sub frame carrier timing clock increments 544, or its timing and synchronization depends solely on TDMA slot timing, or CDMA coded timing that exist in the forward digital control channel carrier wave that can be transmitted by the CCAD-NET-DCS

base site sector radios. In either case, the master timing and synchronization means is governed by the MCMS Teleport Hubs outlink synchronization. The occurrence of multiple outlink subframes 554 as depicted in Fig. 10, corresponds to a period of time equal to one outlink and returnlink frame. The returnlink frame consists of an integer of slots which occur during the period of one outlink frame. This number varies depending on the slot size and the returnlink data rate. The outlink clock, subframe number, along with the slot size, or used to determine the slot number of each slot within the returnlink frame. While slots do not occur on the outlink carrier, the duration of outlink subframes is used the CCAD-NET-DCS base site to align slot boundaries on the returnlink.

Referring to Fig. 4, the CCAD-NET-DCS network can be applied and deployed on a worldwide bases. For example, there are dozens of geo synchronous satellites, represented here by satellite 107b, 107c and 107d. These type of satellites serve almost every nation on the face of the earth. For example Hughes Satellite Communications model HS-376 C Band and Ku Band geo satellite, is available in forty five different versions. Hughes built the first geo satellite called Syncom, and it was launched in 1963. Hughes has supplied more than 40% of all geo satellites in use today. These satellites typically provide C band, Ku band, Ka band, L band and other communications services. satellites are typically three axis stabilized, with an electrical power of 1300 watts provided by photo voltaic cell-solar arrays with battery backup. The satellites support Ku band and C band television and video services, digital radio, direct broadcast satellite (DBS) television services, VSAT and USAT C band, and Ku band data, telephony, voice, fax, telex and other related services. Such a satellite Spacenet One, launched on June 10, 1984 provided C band (3.7 to 6.4 GHz) and Ku band

(11.7 to 14.5 GHz) services. This satellite had six C band 72 Mhz wide (wideband) channels with vertical polarization, 12 C band 36 Mhz wide (narrowband) channels with horizontal polarization, and six Ku band 72 Mhz wide channels with horizontal polarization. These aforementioned satellites are perfect to support the present inventions data protocols, processes and procedures because of their global ubiquity, robust communications protocols, and over all reliability. These satellites are perfect for the present inventions low cost and highly flexible CCADNETDCS network, that provides the aforementioned application specific data services. The inherent stability of these geo synchronous communications satellites, combined with the proven stability of conventional cellular, PCS, control channel and wideband data communications that provide the present inventions application specific data communications, thus creating the network, that, will remain vital well into the 21st Century. In fact, while comparing the present inventions means and methodology with envisioned PCS satellites such as the Iridium network, the Teledesic network, Globalstar, the American Mobile Satellite Communications network (AMSC), and others. These networks, at best will only provide data rates of 5kbps. The networks are based upon marginal geo synchronous satellite networks, low earth orbit (LEO), medium earth orbit (MEO) and others. These networks envision handheld units that communicate directly with the satellite. However, these units are prohibitively expensive, air time and space segment transponder time is costly; one to two dollars a minute for voice and data services with rates of only 5kbps. In addition, there are no plans to provide low cost application specific mobile and stationary communications services. The present invention clearly provides profound advantages over these aforementioned services. The CCAD-NET-DCS network can provide cellular and PCS data rates up to 28.8 Kbps 372, and

wideband data from 64kbps t0 155Mbps as depicted in Fig. 3, between a plurality of application specific communicators 100c through 100g and a plurality of CCAD-NET-DCS base sites 102b through 102h as depicted in Fig. 4. Furthermore, the VSAT/USAT terminal portion 103 of the CCAD-NET-DCS base site as depicted in Fig. 3, can provide up to 64kbps for application specific control channel data packets and 155Mbps for wideband computer file transfer data transfer on the return link 374. Referring to Fig. 4., the present inventions MCMS Teleport operating in the U.S. 106b and the MCMS Teleport operating in Asia 106c, can manage millions of application specific forward and reverse application specific data packets. The present inventions CCAD-NET-DCS is a malleable, and completely flexible application specific data communications network., that provides an unlimited number of application specific variations. Referring to Fig. 14, there is provided a GPS receiver based personnel location communicator 100c. This particular communicator is comprised of conventional off-the-shelf cellular and or PCS handset hardware, firmware and software that supports analog and or digital control channel bi directional communications with any cellular and PCS networks. Additionally, this same communicator utilizes the present inventions modified bi directional application specific analog and digital control channel application specific messaging. This communicator 100c communicates with a conventional cellular and or PCS base site 101 as depicted in Fig. 6., which in turn communicates with the currently serving mobile switching center (MSC) 535. Additionally, this same GPS based communicator 100c communicates with the CCAD-NET-DCS base site 102, when traveling within the effective footprint range of its cellular and or PCS transceiver radios that continually transmit and or periodically transmit specialized CCAD-NET-DCS forward analog control channel multi word block data bits or digital TDMA

or CDMA multi frames with multi bit slot information that contains specialized protocol capability indicator (PCI) fields. These bit/fields cause CCAD-NET-DCS communicators to scan, train and burst standardized application specific data packets. While maintaining standards, these analog or digital packets are enhanced or extended in order to provide additional application data in one packet or multi frame burst.

Referring to Fig. 11, there is provided specialized overhead or forward 40 bit words, 315 and 316, designed for AMPS and TACS analog and, D-AMPS or dual mode analog/digital AMPS and TACS cellular networks. Word 315, depicts a standard overhead filler message. Word 316 depicts a modified overhead filler word that contains application specific data characters 318, a CCAD-NET-DCS network compatible PCI field 327, with a CCAD-NET-DCS over head indicator 317. The application specific characters 318, are four bit variable characters that allow for five character messages that can be designated for application specific communicator class groups, such as the GPS communicator 100c. Additionally, the five characters 318 can contain messages that cause entire class range application specific communicators operating within the footprint range of the currently serving CCAD-NET-DCS base site 102, to respond to these messages. One application example are multiple utility meters that can respond with updated electrical load and usage reports, or the overhead messages can cause various appliances and other electrical apparatuses to power up or power up or power down. The AMPS standard IS-553 for example allows for various orders of overhead messages as depicted in the overhead message table 313. There are also global action messages allowed in the IS-553 AMPS standard as depicted in the global action message table 314. Overhead filler words traditionally perform

control channel synchronization. The CCAD-NET-DCS modified filler application specific message word 316 transmits application specific commands and instructions, while simultaneously maintaining synchronization while being continually interleaved with conventional overhead filler messages 315 within the CCAD-NET-DCS application specific overhead message 541. The modified overhead stream 541 is either continually transmitted or only transmitted when a CCAD-NET-DCS application specific communicator, 100c for example, scans and detects CCAD-NET-DCS PCI fields 317 present in the conventional overhead message 315, then both the standard overhead filler word 315 and the CCAD-NET-DCS modified application specific data word 316 are recognized by the communicator, and the application specific communicator can respond accordingly. If the communicator is only programmed to read conventional overhead filler words, it will ignore this overhead stream entirely.

Referring to Fig. 12, depicted here are four CCAD-NET-DCS global action words that are compatible with AMPS IS-553 standards and TACS standards. While conventional global action words exist to perform a rather narrow scope of message functions, the present invention provides for application specific global action words that support point to point forward messaging; that is a message sent from the MCMS Teleport to the CCAD-NET-DCS base site via satellite network means, that is designated for one application specific communicator. The first CCAD-NET-DCS global action word or word one 319 contains bit fields that indicate to all application specific communicators specially programmed to recognize these words, to expect a message. For example the system identification field (SID) 325 indicates to the communicator that this message originates form the CCAD-NET-DCS network, and not from another

conventional cellular or PCS network. The application field 323 instructs the application communicator that this message is meant for a specific application class. If this field is received by an application specific communicator from another class than designated, that in fact it ignores the rest of the message. If in fact this particular communicator is from the class so designated, it then prepares to read word two 320. Word two contains five variable application specific message characters 326 that contain characters that indicate a specific communicator I.D. five digit number. In this case for example, the PCI field 327 instructs the communicator that it in fact can transmit an enhanced remote access application message (ERAAM) as depicted in Fig. 13, or an extended remote access application message (EXRAAM) as depicted in Fig. 7, or shown in full extension; also known as EXRAAM plus (EXRAAM+) for two packet burst, Fig. 8, burst one 339 and the second burst 340. Referring to Fig, 12. All four words contain an overhead class field 324 that in fact tell the application communicator that these words are CCAD-NET-DCS global action words. Word three 321 and word four 322, contain five variable character fields, 328 and 329 respectively. The entire four word message therefore provides a 15 character message that can contain GPS receiver instructions, a forward page message, e-mail indicators, utility meter remote control, vending machine inventory reports, home arrest communicator and associated wrist band status, and a host of many other variations on this configuration. In fact, including word one 319, six additional words configured like words two through four can be transmitted in one packet, therefore providing 30 application characters in one forward application specific global action message.

Referring to Fig. 14 the CCAD-NET-DCS GPS location services communicator 100c provides personnel location and management tools that can serve many different application configurations, related to business, law enforcement, home arrest, child protection, teen watch, anti-kidnapping and other personal protection and public safety applications. This communicator is physically designed to look like a conventional cellular or PCS hand set. However it has some radical distinctions. For example Fig. 14 and Fig 22 depicts the frontal view and the side view of the CCAD-NET-DCS network GPS location services communicator 100c. This communicator contains a conventional cellular or PCS transceiver board 537, that contains specialized firmware and software that allows this communicator to operate on conventional cellular or PCS networks, and operate on the present inventions CCAD-NET-DCS network. In fact this communicator scheme can operate solely on a conventional cellular, PCS, or wideband data network, or solely on the CCAD-NET-DCS network. This communicator also contains a global positioning system (GPS) receive 536, a unique embedded GPS antenna 367 mounted in the microphone flip out housing 369. In this housing is contained some GPS receiver support circuitry 370, a microphone 368, and a cable 538 that connects the GPS antenna with the GPS receiver 536. This unit also depicts an optional lapel or shoulder mounted GPS antenna 539, with its plug in connector cable 540. This antenna can be worn by law enforcement personnel, home arrest subjects, keep away subjects, various medical outpatients, children, teenagers and others needing monitoring and applied personal safety precautions. This antenna configuration is practical when the communicator is worn on the hip with a provided communicator belt holster. This same configuration can be worn by person placed in home arrest programs, when provided with a non removable wrist band or leg band 542, that contains a

radio transmitter, and transmits signals to an embedded wrist or leg band receiver 543 mounted inside the communicator. This receiver detects the data codes and radio frequencies transmitted from the wrist or leg band that has an effective range of about 100 feet. This detection range allows the user to set the communicator down, but if he walks more than 100 feet way from the communicator, the receiver then no longer detects the signal, and sends violation bits, via software and firmware means from the cellular transceiver 537 to the closest serving CCAD-NET-DCS base site 102, or conventional cellular or PCS base site 101 as depicted in Fig. 6. Referring to Fig. 14, and Fig. 22, the GPS communicator also has optional voice service capability, so that the user can utilize this communicator for voice calls when operating in a conventional cellular or PCS network. There is provided a microphone 365 mounted in the flip out housing 368 that is hinge mounted 364 and movable 336, adjacent to the GPS antenna 367 as depicted in Fig. 14 and Fig. 22, and a speaker 362 mounted in the main enclosure body in order to support voice services. The communicator key pad 355, provides for conventional directory number dialing, specialized code entering, message sending, communicator programming and other related functions. There is provided a specialized application specific message menu with controls 359 that allow the user to access various messaging choices. Also, there is a send button 363 used for conventional cellular and PCS service request, plus it is used for various menu driven application specific messaging. A red light emitting diode (LED) light indicator is provided 361, that indicates to the user when the GPS receiver is correlating a new relative position, and the green LED 360 that flashes when GPS receiver has completed the new relative position correlation. The liquid crystal display (LCD) 356, provides for various messages. These messages can display communicator system status, such as battery level

and other conventional information. The display can be used to inform the user that he has received and alpha numeric message from the present inventions specialized forward messaging protocols as heretofore mentioned and depicted in Fig. 11 and Fig. 12. For example the LCD display reads; "Report Your Position" 358. The user has just received a forward message from the nearest, currently serving CCAD-NET-DCS base site.

Referring to Fig. 9, in this example the immediate forward message is derived from an AMPS or TACS cellular multi word block message packet, based on the 40 bits words heretofore depicted in Fig. 11 and Fig. 12. In Fig. 9 the words are packetized into an overhead stream or global action message stream, that contains CCAD-NET-DCS application specific data in each word block. This "Report Your Position" message is sent in hexadecimal or binary data from, wherein, a coded number is sent via the heretofore mentioned application data message. The GPS personal management communicator 100c receives the message and interprets data via firmware and software means, and displays the message. Referring to Fig. 11 and Fig 12, the user can choose to respond or not respond. If he chooses to respond, and he is equipped with the lapel GPS antenna 539, he simply reaches down and presses the send button 363, and the GPS relative location message is sent. If he is not equipped with the optional lapel antenna, he then reaches down, pulls the GPS personnel management location communicator 100c, opens 366 the flip out GPS antenna housing 369, holds it upright, and awaits for a completion of the received GPS satellite code correlation. Once the green LED 360 light goes on, he knows the correlation is completed and he presses the send button 363. The location request, originated from an applications provider.

Referring to Fig. 19, the application provider 120, in this case, a personnel management company that specializes in tracking people on foot or in motor vehicles. The provider or facilitator, needs to locate a particular GPS personnel management communicator use 100c. He prepares a forward action message, "Report Your Position." This message is sent via internet socket means. There are many data protocols and data rates that can be utilized over the internet via socket connected and/or frame relay, and therefore well known in the art, therefore specific descriptions in this instance are not deemed necessary. The message is sent via the internet to the MCMS Teleport 106, which is the master data management entity that contains many novel technological hardware, firmware and software elements and procedures provided by the present invention. Coupled with the CCAD-NET-DCS base site means and method, create a completely novel application specific data communications network. For example, in this instance the "Report Your Location" message is generically handled by the MCMS Teleport Hub as an action message, or a command message, or an application specific status report message, or an update command, or other related messages. For the sake of brevity, the term action message will be used. The action message is sent directly to the MCMS Teleport data management terminal network management subsystem 525. Referring to Fig. 5, the network subsystem 525 is comprised of the data reception and distribution (DRD) terminal 167, the graphic interface system/integrated voice location (GIS/IVLS) terminal 591, the data decoder (DEC) terminal 168, the comparative data base (CDB) terminal 169 the CCAD-SAT-home location register or data control reception data base (HLR/DCR) 162, the action data base (ADB) terminal 119, the demand assigned multiple access (DAMA) master control terminal 544, and the time division

multiple access (TDMA) master control terminal 545. These main terminals can be any type of computer, that utilizes a viable operating system. Most service control point, systems utilize Sun/Sparks Unix 166 based systems. These Unix terminals, capture, process and store all incoming and out going application specific data. When the action message arrives at the MCMS Teleport, it is first capture by the DRD terminal 167. The DRD converts all incoming data into a Unix 166 based local area network (LAN) protocol. This protocol can be an Ethernet based protocol, or any other efficient LAN based bi directional communications protocol. The DRD then distributes all incoming action messages that are configured to adhere to each application provider messaging protocol. However each incoming action message must be converted to the appropriate CCAD-NET-DCS network MCMS terminal NM-subsystem 525, LAN 526, and man-machine interface (MMI) terminal UNIX protocols 525; land based SS7/IS-41 node type protocols, and space segment SS7/IS-41 CCAD-NET-DCS base site type protocols. The MCMS terminal NM subsystem 525 divides and converts application provider protocols into three classifications, socket frame relay WWW protocols, space segment SS7/IS-41 bi directional protocols, and SS7/IS-41 type land based inter network element protocols. The MCMS terminal NM subsystem 525 passes application provider action messages through the various terminal procedures to the SS7 packet switching subsystem 522 via the multiport router 523 to the proper network entry point in the IF subsystem 521. Similarly, the SS7 packet switching subsystem 522 and the multiport router 523, routes messages from each CCAD-NET-DCS base site, 516, 517, 518, 519, and 375 for and each currently operating application specific communicator 100c through 100 p, and back to the proper application provider 120, utilizing the appropriate application provider protocol. The SS7 packet switching subsystem

522, and multiport router 523 which are directly controlled by the MCMS terminals NM subsystem 525, route the application specific packet to the selected IF subsystem 521 port for delivery to the application provider 120. Packet routing instructions are determined by the attached addressing information contained within the user messages; packet headers, application provider message headers, application specific communicator CCAD Identification numbers (CIN) 264, CCAD Serial Numbers (CSN) 136, and application class numbers (CAN) 323 contained within each transmitted cellular/PCS analog or digital control channel application data packet, as shown in Fig. 7, and Fig. 12 respectively.

Referring to Fig. 19, all application provider and application specific communicator messages are routed appropriately in accord with dynamic routing table data bases, and comparitive location tables provided within the data processing procedures of the MCMS terminals NM subsystem 525, and the present inventions specially configured home location register, also known as a data clearing register (HLR/DCR) 162. The MCMS Terminals NM subsystem 525 also routes network management messages. The MCMS terminal NM subsystem 525 therefore manage all outbound and inbound packet switching, graphic location image snap shot files, CCAD-NET-DCS base site VSAT and cellular/PCS operations, IF, and satellite/cellular/PCS RF amplification system maintenance. The IF subsystem 521 receives all out bound messages that are designated to be delivered to an application specific communicator 100c via a CCAD-NET-DCS base site 516, 517, 518, 519 or 375. The user class, application class and other identification bits contained within packet, along with packet length determine which type CCAD-NET-DCS subnetwork the packet is being sent too. The IF subsystem 521 consists of satellite communications modems, in

various configurations, that convert the MCMS Terminals NM subsystem 525 messages to, or application specific communicators from there respective protocols. There are several configurations of the IF equipment known in the art today, in general, it consists it consists of outlink modulators (OM) 553 for transmission from the hub to the CCAD-NET-DCS base sites 516, 517, 518, 519 and 375 via outlink frequencies, and burst demodulators (BD) 552 from the CCAD-NET-DCS base sites 516, 517, 518, 519 and 375 via returnlink satellite frequencies. There is one OM 553 per outlink frequency, and one BD 552 per returnlink frequency. The MCMS Terminals NM subnetwork 525 and other networking MMI terminals, also instruct the IF subsystem, whether the outbound packet is meant for a localized high density low mobility DAMA CCAD-NET-DCS subnetwork 546 as shown in Fig. 23, or a world wide TDMA based CCAD-NET-DCS master network as shown in Fig. 4. Referring to Fig. 19. The MCMS Terminals NM subnetwork 525 also govern the processes and procedures controlled by the DAMA master controller terminal 544, and the TDMA master controller terminal 545. Whether the CCAD-NET-DCS base site is operating in a TDMA star topology subnetwork, or is operating in a DAMA mesh topology network, the CCAD-NET-DCS/MCMS Teleport hub 106 is designed with unique flexibility in order to provide a DAMA or TDMA based topology as per packet event demands, this is a first in the art. Furthermore, the present invention creates and provides the first DAMA mesh topology based, high density and low mobility configured; satellite, cellular and PCS based multi-protocol, data communications subsystem.

The present invention provides an incredibly flexible, multi-protocol and multi service CCAD-NET-DCS network. The inventions key means, methods

and apparatuses are incorporated in the application specific communicators, multi application PDAs, its MCMS Teleport Hub, and its many versions of the CCAD-NET-DCS base sites; that fully utilize existing cellular and PCS telecommunications networks, cordless telephone protocols, satellite networks, private and public SS7 networks, public and private broadcom networks, wideband data networks such as Metrocom, the internet, WEB TV, caller I.D.; networks and apparatuses; thus creating the first fully functional, user friendly; virtual application specific data communications network. The present invention provides the corner stone that completely integrates a wide range of services, into one low cost virtual data communications system.

For example, referring to Fig. 14, and Fig. 22. The CCAD-NET-DCS personal location communicator 100c, is configured to send and receive the present inventions microburst short packet analog or digital control channel application data. This communicator can receive the present inventions heretofore disclosed unique forward analog and or digital control channel application specific messaging. The forward action or command message can be sent from a multitude of conventional and unique designed man machine interface apparatuses and communications networks. In one scenario, a person can simply dial up a messaging service using conventional public switched telephone network. In still another scenario, the forward message request can originate from the present inventions CCAD-WEB TV television monitor 517, the PDA 554, as depicted in Fig. 18, and other specially configured apparatuses such as a portable personal computer. The message delivery medium can be a cellular based IS-136 DCCH forward messaging service, an IS-95 CDMA forward messaging service, an upbanded CDMA forward messaging service, an upbanded TDMA forward

messaging service, or a GSM TDMA forward messaging DCCH service, a mesh node wideband data forward messaging service, or a broadcast paging alpha-numeric messaging service, and send a message the requests, 'report your position.' The forward messaging medium can also be delivered via one of the present inventions CCAD-NET-DCS hybrid; cellular, PCS, satellite and wideband data network base site configurations. Each one of these conventional, and novel forward messaging means can be utilized by the present inventions hardware, firmware and software derived methodologies. Once the forward message is received by the communicator 100c as depicted in Fig. 14 and Fig. 22, the communicator creates a response message contained within an appropriate analog or digital, control channel, traffic channel, or wideband data channel data packet.

Referring to Fig. 7, depicted here is a seven data block extended remote access application message (EXRAAM) packet 423 designed for AMPS and TACS cellular analog and digital networks. Each data word contains user identification data, communications unit identification, applications class, packet routing instructions, and application specific data. The A word 125 contains the NXX and XXXX coded number designated as the CCAD identification number CIN. The B word 126, contains the NPA 133 of the CIN number. This three digit code 175, acts as the destination point code (DPC). This 175 number is a derivative number that is closely related to a conventional telephony area code. However, this code does not allows for conventional dialed number PSTN access. Therefore, the CIN acts only as an identification and routing number. The communicator or PDA cannot be accessed from a conventional landline telephone. The C word contains the eight character CCAD serial number (CSN)

136. In some CCAD related applications, this number is used to identify the present inventions application specific communicator or personal digital assistant (PDA), especially if the communicator is configured for cellular or PCS voice service authentication, and authorization. Still in other derivative applications, the CIN is solely used for CCAD communicator or PDA identification. In some applications the CIN is permanently embedded via hardware and firmware means, in the same secure manner as conventional cellular and PCS electronic serial numbers (ESN). Therefore the CIN can serve a dual purpose of identification and routing within the CCAD-NET-DCS network. This EXRAAM packet provides for up to four words of application specific user or status response data. This dual mode packet can operate in conventional cellular or PCS networks, or operate with CCAD-NET-DCS base sites that are configured to operate within AMPS or TACS analog or dual mode analog/digital networks such as IS-136 TDMA, and IS-95 CDMA. Some conventional networks allow for only two information words to be transmitted, received and processed, and other conventional networks allow for up to four user information words to be transmitted, received and processed in one event burst. In the example provided here, the H[1] word 131 contains seven user information characters and one specialized routing character 138. Conventional cellular and PCS utilize a procedures called remote feature access. Within the IS-41 guidelines, there is a provision for this specialized access. The means and methods of the remote feature access procedures are well known to those whom practice the art, so specific references to this conventional procedure are omitted. Broadly, the remote feature access causes specialized routing to occur when the currently serving mobile switching center (MSC), receives an origination packet; which is indicated by the order qualifier code ORDQ 134, and the order code ORDER

135, containing digits that indicate a remote feature access. When ever there is a ' *' which equals the hexadecimal character A or "#' which equals the hexadecimal character C in the first digit 138 of the first word 131 of the called address; remote feature access procedures are activated by the MSC number translation tables. The MSC then examines the 175 NPA 133 of the B word 126, which indicates that this packet belongs to a designated global, cluster and node address located within a given private or public SS7 network. In this case, the DPC/NPA causes the packet 423 to be routed to the present inventions MCMS Teleport Hub home location register or data clearing register (HLR/DCR) 162, as shown in Fig. 5 and Fig. 19. The HLR/DCR is a service connection control point (SCCP) with its own unique global, cluster and node address; such as 227-199-255. The currently serving MSC therefore translates the ten digit number; 175-421-1551 to 227-199-255 for SS7 routing purposes. Referring to Fig. 7, the H[1] word 131, H[2] word 132, H[3] word 123, and H[4] word 124 contains two way paging/messaging data and global positioning system (GPS) relative positioning data. For example in the H[1] word 131 and H[2] word 132 two way paging or messaging data consists of the caller return ten digit telephone directory number which is comprised of the NPA or area code 425, the NXX or office code 140, XXXX or node code 122. There is also provided a pre determined and stored voice message or text message number 424. When this portion of the EXRAAM packet is received by the present inventions MCMS Teleport Hub, various processes and procedures occur. The EXRAAM packet is one of many data packet variations provided by the invention that fall under the microburst short packet data messaging category. Since this packet has been transmitted to, and processed by a conventional cellular or PCS network, the routing of this packet occurs in the following manner. Referring to Fig. 6, the personal management

communicator 100c is configured to transmit two way paging or messaging data and GPS location data. Furthermore this communicator 100c can operate solely with the inventions CCAD-NET-DCS base site 102 and other virtual network elements, or it can operate with a conventional cellular or PCS base site 101, and mobile switching center (MSC) 535. As heretofore described, the EXRAAM packet as depicted in Fig. 7 and ERAAM packet depicted in Fig. 13, can operate in a conventional cellular or PCS network, or these packets can be recognized and processed by the inventions CCAD-NET-DCS base site configurations, and MCMS Teleport Hub without the need of processing and routing the packets through a conventional cellular or PCS MSC. Referring to Fig. 8, specialized large capacity EXRAAM packets; designated as the first burst 339, and the second burst 340 in this depiction, can be utilized only by the inventions CCAD-NET-DCS virtual network, in that these packets will not operate in a conventional cellular or PCS network. The first burst 339, contains an A, B, C word, with an additional six H words. This packet provides a total of 192 bits, thus creating 48 characters of application specific data. The second burst 340 consists of one I.D. word that contains a C word derivative that does not contain the CSN but uses the CIN; 175-421-1551 for example as the routing and packet identification means, as depicted in Fig. 7, 127. Referring to Fig. 8, there is provided seven additional H words that contains 224 bits 224 bits, thus creating 56 four bit application specific characters. By combining the first and second burst, and utilizing both burst as one event, the invention provides 418 bits, thus creating a total of 104 application specific four bit characters. The CCAD-NET-DCS communicators, 100c, 100d and 100e for example are configured to process and transmit the two burst scheme. Each one of these communicators or created to provide different application specific services.

Referring to Fig. 6, this depiction shows the CCAD-NET-DCS network. The personal management communicator 100c can transmits packets to a conventional cellular or PCS base site 101 or to the CCAD-NET-DCS base site 102, when using the microburst class of EXRAAM and ERAAM packets. When utilizing a conventional cellular and PCS network, the following processes and procedures transpire. Referring to Fig. 7, when the EXRAAM packet 423 is transmitted to the nearest serving conventional cellular or PCS base site 101 as depicted in Fig. 6, it is received by the base site, recognized and relayed to the currently serving cellular or PCS MSC 535. Once the MSCs number translation tables complete the heretofore described procedure, it is relayed to the inventions MCMS Teleport Hub 106, via the currently serving SS7 network 262. The packet is converted to SS7 compatible TCAP and mobile application part (MAP) inter-signaling protocols by the MSC 535, relayed to the nearest serving signaling transfer point (STP) 109. The STP is a dynamically managed receiving, routing, and data packet transfer medium, that is an essential SS7 network element. STPs are placed and arranged in a mesh node topology, that allows for multiple SS7 link transfer from one STP to another, or from a service connection control point (SCCP) to many STPs, or from one STP to many SCCPs or service switching points (SSP). An SSP is the SS7 compatible signaling processing node that is typically adjacent to an operating MSC. For example, if one multiple link STPs capacity is saturated at the moment a packet is sent from an SSP, then the packet is routed to the next closest serving STP, and the packet then is further routed to multiple STPs until it reaches the inventions MCMS Teleport Hub 106 via the currently serving SS7 network 262. The packet is received at the MCMS Teleport Hub 106, various data management processes and protocol logical procedures

apply. Referring to Fig. 5, the two way messaging part of the packet, that is contained in H[1] word 131 and H[2] word 132 as depicted in Fig. 7. In this instance, the two words contain a directory number that a landline telephone or mobile phone user dialed, and entered his ten digit directory number. The area code or NPA '408' 425, contained in H[2] word 132. The NXX or office code 140 number '469' and the XXXX or node code 122 '4201.' Referring to Fig. 14, when the page is sent from the currently serving cellular or PCS network, the present inventions CCAD-NET-DCS virtual network, or a conventional broadcast paging network, or a IS-136 DCCH compatible cellular network, or an IS-95 CDMA forward messaging network, or a GSM TDMA DCCH/BCCH compatible network or an upbanded 2Ghz TDMA PCS network, or an upbanded 2Ghz CDMA network; a numeric message appears 'Message: 408-469-4201, 358b that is similar to a conventional pager display 356b that can also appear on the LCD display of the personnel management communicator 100c. Then the user can choose to send a two way messaging response or not. If in fact the user chooses to respond the page, he simply scrolls the menu keys 359, selects a pre determined message, such as message '4' 424 contained in this H[2] word 132 as depicted in Fig. 7, enters his personal identification number (PIN) 139, and presses the send button 363. Referring to Fig. 5, when the application specific packet arrives, it first is intercepted by the data reception and distribution terminal (DRD) 167, that is an integral element of the MCMS network management subsystem 525 as depicted in Fig. 5, and Fig 19. The two way paging/messaging response procedure is comprised of a series of programmed protocol events. When the personal management communicator user, initially establishes two way messaging and GPS services utilizing the present invention a number of important options are available. First of all, one option that the invention provides

is automatic integrated voice response services. Within the context of this protocol, the return message that contains the messaging callers ten digit directory number, is sent from the DRD 167 to other MCMS terminals, processed accordingly and sent to the IVR system that has stored numerous voice responses that were initially entered dynamically by the user, from a conventional landline telephone. Message Four for example, contains a digitally recorded voice response that says, "I am tied up the rest of the day, and I cannot respond until after work hours." The IVR, dials the number 408-469-4201, and if the message caller picks up the phone, he will hear this aforementioned message in the form of the personnel management communicator user's voice. In addition, if the user wants CCAD-NET-DCS TV messaging services, the CCAD-NET-TV protocol causes the exact same message to be stored in the CCAD-NET-TV internet/broadcom server data base 612, and then forwarded automatically or via manual command to a CCAD-NET point of presence net return pathways 613. This data base is an important derivative of a conventional e-mail system, that has automatic e-mail indicators. If the CCAD-NET-TV monitor is turned on, a message appears that says you have a message. If the messaging caller is viewing the monitor screen, and is watching a conventional TV program, the monitor emits a beeping tone, and displays a message waiting indicator. The CCAD-NET-TV monitor is essentially a simpler form of a personal computer that is manufactured in the form of a television monitor. This unit provides all the conventional TV programming choices plus limited internet or broadcom network access. As long as the computer component portion of the CCAD-NET-TV monitor is powered on it will store all CCAD-NET-TV messaging waiting indicators, even if the monitor portion is turned off. Referring to Fig. 26, as soon as the monitor 571d is power up, the CCAD-NET-TV network access console

583, will cause the message 610 to appear on the screen 594b. If the monitor 517d and the console 583 is also not powered, the message will have to be retrieved manually, in the same way conventional e-mail is retrieved. Conventional WEB TV type consoles offer a plethora of features and services, such as; telephone management, TV and VCR control, internet access, and interactive TV services. The telephone management system can turn the TV portion into a fax machine, conference phone, caller I.D. system, digital answering machine or on-screen telephone directory. These systems offer catalog shopping, home banking and access to data bases such as the Yellow Pages. These units have credit card readers for on-line purchases. These consoles have 16 bit stereo, 100 to 200 Mhz Pentium computer chip power with 32 to 64 bit RAM. Some have 64 bit RISC processors also. The invention is the first to provide two messaging/paging services, location services, snap shot displays of computer generated mapping that shows where people, motor vehicles and FEDEX packages are located, and wireless services interfaced with the inventions nano base site; interfaces with the CCAD-NET TV console. The invention also provides for message delivery via fiber optic or copper based broadcom networks, in the same means and methods as heretofore described. Referring to Fig. 19, the MCMS network management subsystem 525, is also interconnected with any broadcom network that provides a wide range of communications services. Cable television services, broadband telephony, bi directional data, CCAD-NET application specific data between the inventions base sites, and CCAD-NET TV smart data services can all be provided. Referring to Fig. 6, the MCMS Teleport Hub 106 can operate a broadcom cable television network headend 584. A cable head end is typically comprised of primary broadcom amplifiers, modulators, demodulators, splitters, copper-to-fiber converters and other conventional

broadcom equipment. However, the invention provides a specialized headend that transmits on a defined set of broadcom channels, and subchannels much in the same way as video text services are delivered, closed captioning, and other value added services. For example, the present invention can deliver messaging to cable TV subscribers in multiple ways. One way is to use the same messaging transport medium that conventional cable TV operators use to deliver pay-per-view authorization data to cable TV set top boxes. Each cable TV set top box as a unique user address code. When a conventional pay-per-view authorization is sent, the program activation code is always accompanied by the individual set top box code. When a code is sent, it is transmitted in a global means and method. This global action sends the authorization throughout the entire network, however only one set top box will recognize the code. The invention provides the means of sending the same heretofore described message response to a specially configured set top box, that recognizes the same code, but all processes and causes the message 610 to be displayed in text form as depicted in Fig. 26. The same message can be sent to the CCAD-NET TV console 583 by any central office telephone network switching office, via caller I.D. means and methods. Conventional WEB TV consoles offer hands free caller I.D. services. The invention extends this feature to include alpha numeric messaging, that originated from one of the invention application specific communicators and PDA. When a calling party's number is sent to a designated telephone instrument that has the capability of displaying the calling party's telephone number. In the same way a single cable TV set top box recognizes pay-per-view authorization and the inventions broadcom messaging, a caller I.D. display can also display the same message 610 as shown in Fig. 26. The invention provides the means and method of attaching this message to a landline dialed number string. The inventions

MCMS Teleport Hub supports caller I.D forwarding on PSTN and broadcom telephony networks. The dialed number acts as the 'Trojan Horse' for the contained message. The CCAD-NET TV console contains hardware, firmware and software means that causes the console to operate like a telephone instrument with caller I.D. display capabilities. However, instead of displaying the dialing party's telephone number and the contained application message 610 on a telephone instrument LCD display, the message is displayed on the CCAD-NET TV monitor. The CCADNET TV console 583 is also a derivative telephone receiver with an RJ-11 type plug interface that connects directly to any conventional telephone network. In addition, the console can receive caller I.D. information via broadcom and landline telephony networks. These types of networks tend to be prevalent in developing Third World Nations. These networks can provide many different types of services using one broad based signaling transmission source. These multi service networks are comprised of fiber optic backbones and fiber optic feeds and/or coaxial copper cable feeds to individual dwellings. The invention can operate with complete flexibility. Furthermore, the present inventions broadband configured CCAD-NET-DCS base site can provide wireless services to local areas utilizing cellular and PCS analog and/or digital control channel application data.

Referring to Fig 6, the broadband configured CCAD-NET-DCS base site 555 acts as the front end air interface medium. The base site further acts as a multi service convergence point 586. The broadband multi services network 568 acts as the data multi service communications transport medium 585 that delivers the bi directional data to the MCMS Teleport Hub 106, and the MCMS network management subsystem 525, with the specialized cable headend 584 acting as

data processing convergence point on the back end. All the heretofore mentioned systems and services can operate independently, and completely separate from other conventional cellular, PCS and/ or satellite networks. The base site 555 can be configured to deliver these same services in the form of Microburst data, Vburst data, or Macroburst data. The base site will support any designated communicator such as the personnel management communicator 100c that uses Microburst and Vburst data protocols, and the CCAD PDA 554 that uses Microburst, Vburst and Macroburst bi directional data protocols. The PDA 554 also may operate in conventional cellular and PCS network base sites 101, mobile switching centers (MSC) 535, and SS7 networks 262, in the aforementioned means and methodology. The PDA can be configured to transmit and receive Microburst 561, Vburst 562, utilizing from 450 Mhz to 2Ghz cellular and PCS frequencies 372 that transport the inventions control channel application data analog and digital protocols through conventional networks and the inventions broadcom, internet, wideband data, and specialized satellite network. Referring to Fig. 18, the broadband configured CCAD-NET-DCS base site, acts as a CCAD-NET gateway 555b. This gateway provides a low powered air interface medium on the front end via the gateway, and a broadband or internet gateway on the back end 570. The base site/gateway 555b supports all of the present inventions analog and digital control channel and digital access channel, and digital traffic channel application specific data protocols. The base site/gateway 55b also supports various high density and low mobility cordless telephone standards. The standards 573 include Digital European Cordless Telephone (DECT), Cordless Telephone Zero (CTO), Cordless Telephone One (CT1), Cordless Telephone One plus (CT1+), Cordless Telephone Two (CT2), Cordless Telephone Two plus (CT2+) Personal Handy phone System (PHS), Digital Cordless System 1800

(DCS1800), and Japanese Cordless Telephone (JCT). These standards represent a complete picture of the FDD and TDD based cordless telephone system available in the world today. The invention provides specialized bi directional analog and digital; application specific data protocols. CCAD-NET-DCS communicators and PDAs can be configured to communicate the inventions specialized CCAD-NET data protocols, within the prescribed operational guidelines of domestic and international cordless telephone standards.

Referring to Fig. 13, depicted here is an example of another Microburst class of short packet data; the enhanced remote access application message (ERAAM) packet 533. The major difference between the aforementioned EXRAAM and ERAAM packet is that the C word is omitted, and an additional application specific data word is added. This configuration allows for additional application specific data to be transmitted into conventional cellular and PCS networks without the necessity of modifying any of the essential network elements, such as MSCs and conventional base sites. The ERAAM packet is fully conforms with, IS-553, IS-136, IS-95 and IS-41/ SS7 ANSI standards. This packet utilizes the CIN 264 and 133 as the sole means of user and communicator unit identification, and for CCAD-NET-DCS network routing. Various CCAD-NET-DCS application specific data communicators have permanently embedded CIN numbers, much is the same way that conventional electronic serial (ESN) are embedded in cellular and PCS communicators and handsets. Because conventional cellular and PCS network mobile switching center (MSC) translation tables data bases processes data in certain hierarchical means and methods, the ERAAM data words are specially arranged to completely conform to this hierarchical protocol. When the ERAAM packet is analyzed at the MSC,

the translation tables data process means and method always examines the first digit 342 of the H[1] ERAAM word 131. If it is a star '*' or "#' symbol which represents hexadecimal A and C respectively. Then translation tables examine the embedded CIN 264 and 133, located in the A word 125 and B word 126. When the ERAAM packet 533 arrives at inventions MCMS network management subsystem 525 as depicted in Fig. 5, the packet words are examined, processed and routed to various network subsystem terminals for appropriate deciphering, application specific data base updating, currently serving network system; user location updating, data storage, and application specific provider routing. Referring to Fig. 13, the ERAAM packet is analyzed is the following sequence. The A word 125, and B word 126 is examines for routing information, application specific class identification and application specific class data base location. In this instanced, this packet contains global positioning system (GPS) longitude, latitude, Greenwich Meantime data(GMT), altitude and other information. Next the H[1] ERAAM word 1, 131,H[2] ERAAM word 2, and H[3] ERAAM word 3, 123 are examined. Contained within the application specific data spaces of these three words are longitude coordinance minutes 343, seconds 348 and milliseconds 347 contained in the H[1] ERAAM word 1, 131, latitude coordinance minutes 349, seconds 616, milliseconds 617, and microseconds 618, contained in the H[2] ERAAM word 2, 132b. The H[3] ERAAM word 3, 123, contain differential GPS data 344, other GPS related data 345 and 346. These five words comprised the primary ERAAM packet. This five word packet 533b, is used for cellular and PCS networks that are configured for 16 digit dialing only. In cellular and PCS networks that are configured for 28 and 32 digit dialing, the H[4] ERAAM word 4, 124b and H[5] ERAAM word 5, 341 is added to the standard ERAAM packet, thus creating an ERAAM plus data

packet 350. Contained within these packets are two way paging or return messaging data. These numbers 352, 351, 353 and 354 represent specialized formatting for the heretofore mentioned pre-programmed or 'canned' paging response, and messaging caller directory numbers.

Referring to Fig. 7 the EXRAAM packet 423, also contains longitude and latitude data, 143, 160, 141 and 142 contained in the H[3] EXRAAM WORD 2, 123, AND H[4] EXRAAM WORD 4, 124. The complete EXRAAM packet 423 contains both two way messaging and GPS data. This packet can be transmitted from application specific communicators that are configured with a broadcast pager receivers, or the software means for providing IS-136 TDMA DCCH forward messaging, or IS-95 CDMA Forward messaging, wideband data messaging.

The inventions MCMS Teleport Hub manages GPS data sent from all CCAD-NET-DCS application specific communicators. The same multi processing and multi delivery procedures apply for GPS related Microburst packets; RAAM, ERAAM, ERAAM+ and EXRAAM, Vburst packets; traffic channel data burst packets, and Macroburst packets; formatted packet data, and computer file data packets.

Referring to Fig. 14, Fig. 18, and Fig. 25. The personnel management communicator 100c depicted in Fig. 14, and the PDA 554 depicted in Fig. 18, and Fig. 25 are configured to collect, process and transmit complete global positioning (GPS) data utilizing specialized Microburst, Vburst, and Macroburst protocols. These application specific protocols can operate within cellular, PCS,

mobile satellite, wideband data and cordless telephone FDD and TDD air interface frequencies and protocol standards. Referring to Fig. 7, and Fig. 13, the EXRAAM packet 423, and ERAAM packet 533 are but two examples of the inventions application specific air interface protocols designed for conventional AMPS and TACS cellular networks. These same protocols will operate with the inventions cellular, PCS, wideband data and satellite compatible base sites. When an application packet containing GPS data and or other location based data is transmitted from an application specific stationary or mobile communicator and or PDA communicator, and processed through a conventional network or the inventions CCAD-NET-DCS virtual network, the same packet processing and packet delivery procedures apply.

Referring to Fig. 5, and Fig. 19, when the MCMS terminals network management subsystem 525 receive any one of the invention GPS or other location based packet data, its management, processing and delivery to designated application providers and direct delivery to users is accomplished by the following means and methods. In Fig. 5, a generic multi-tasking, multi-protocol base site 545 designed for use with internet, broadcom networks is depicted. The CCAD-NET-DCS virtual network 582 in terms of landline bi directional signaling, can support a wide range of internet, broadcom, and PSTN inter and intra node protocols. These protocols includes but are not limited to; asynchronous transfer mode (ATM) 578, SS7 56 Kbps and 64 Kbps 262, inter services digital network (ISDN) 575, local area network (LAN) protocols 576, X.25 packet 526 protocols. Each can transport bi directional Microburst 581, Vburst 580, and Macroburst 579 data.

Referring to Fig. 18, the invention provides numerous means and methods of delivering GPS location data to, application provides such as; motor vehicle management facilities, personnel management facilities, package tracking, 911 emergency location services, home arrest and other custodial tracking providers. The invention is designed to deliver GPS data to personal computers that are connected to private networks, satellite based internet , land based internet 105 or broadcom networks 572 that have resident moving map software. This software provides real time visual tracking of persons and objects moving down a given street or highway. These methods work great for business users, and even a private individual can purchase a personal computer, expensive mapping software, and track his motor vehicles, family members, pets and other persons and objects. However this approach is expensive for the consumer, and difficult for the average person to embrace its functionality. The present invention provides an elegant solution for this problem.

Referring to Fig. 18, when the inventions GPS data packet arrives at the MCMS network management subsystem 525; DRD terminal 167, it distributes the data to the appropriate data base. The GPS data packet can originate from personal management communicator 100c, or the inventions PDA 554. The GPS data packet can be received by the inventions cell/sat CCAD-NET-DCS base site 102, relayed to geo synchronous satellite 107, and relayed to the CCAD satellite earth station (SES) 109. Referring to Fig. 19. The SES 109 processes the packet at the RF subsystem 520, relays the packet to Intermediate Frequency (IF) subsystem 521. The IF subsystem determines whether the GPS packet originated from a CCAD-NET-DCS base site 102 that is operating in a DAMA topology network or a TDMA star topology network. The GPS packet is therefore sent to

either the DAMA master control system 544, or the TDMA master control system 545. The GPS packet is sent from either master control to inventions network management subsystem 525 via the MCMS Teleport Hub 106 LAN system 526. The inventions GPS packet can also originate from a conventional cellular or PCS network, represented here by a conventional cellular or PCS base site 101 and mobile switching center (MSC) 535 located in New York City. For example, this conventional network might by operated by Bell Atlantic Nynex, Airtouch Communications, or any other large, medium or small cellular or PCS carrier. The GPS packet is then relayed to the MCMS Teleport Hub 106 via SS7 network 262, SS7 STPs 109, and the inventions co-located application specific STP 237. The STP 237 that relays the GPS packet to the multi protocol, multi-port router 523. The router then relays the GPS packet to the DRD 167 for further processing.

The GPS packet can be relayed to the MCMS Teleport Hub 106 from another network point of origin. Referring to Fig. 23. Depicted here is a representation of the inventions hybrid mesh topology node/star topology node network 546 (HMS). This network supports; all Microburst, Vburst and Macroburst data packet protocols. Each one of the base site nodes 'a' through 'o' support the inventions PDA 554, and all the inventions application specific stationary or mobile communicators 549. For example, if a mobile based GPS communicator travels in this network and transmits to node 'm,' node 'm' then relays the GPS packet to all other nodes depicted here, via the inventions modified inter node communications protocol, that conforms to cellular and PCS standards or is compatible with inventions wide band data or Macroburst inter node protocol . The GPS packet via relay means ends being received by a CCAD-

NET-DCS gateway 545b, that is interfaced via hardware, firmware and software means to one of the nodes, in this example node 'o' of the inventions HMS network 546. The gateway 545b provides access to the internet 105 or private network 626 via TCP/IP Socket 527 protocols. The gateway 545b can be configured to send the GPS packet to the MCMS Teleport Hun 106 where it is processed in accord with the heretofore mentioned processes and procedures. The GPS data packet can originate from the inventions PDA 554 and is processed in essentially the same manner. The inventions HMS network can be manage by a CCAD-NET-DCS Mini Hub 543. This mini hub maintains authentication data bases, counts data packets, and controls packet routing. For example, an application specific communicator 549 can transmit a packet to a PDA 554, without the need of the transaction being sent to and managed by the MCMS Teleport Hub 106. The mini hub 543 can communicate with the MCMS Teleport Hub 106 via the inventions VSAT 103, or internet link 544, and directly process the inventions data from a separate gateway 545b, or a co-located cell, PCS or wideband data cell 542. The Gateway 543 is controlled by the MCMS Teleport Hub 106. Periodically, the MCMS Teleport Hub 106 transmits mini hub maintenance programs, packet count polls, authentication and user account status updates, and other data. The use of the mini hub saves MCMS Teleport Hub data processing and management capacity, VSAT satellite space segment time, and internet capacity. The mini hub 543, also transmits packets sent from PDAs 554 and application specific communicators 549, that are intended for other PDA and communicators operating in other HMS networks, conventional cellular and PCS networks, and CCAD-NET-DCS base site elements that are operating in remote areas and controlled by the inventions heretofore mentioned VSAT systems. The

mini hub 543 also receives packet sent from PDAs and communicators operating in those distant networks.

Referring to Fig. 6, a specialized nano communications system can operated in a commercial passenger jet liner 509, or an ocean going ship 510. A nano base site 511j, application specific communicator 100j and a PDA 554j can operate in a specialized means and method, can operate on a commercial jet liner. A user may want to communicate to another user, or an applications provider located on the ground. If so the invention provides for cellular, PCS or mobile satellite data protocols that will operate on conventional Airphone cellular or PCS frequencies that are allocated by the FCC. The control channel, and digital access channel frequencies are used by cellular and PCS networks to communicate with jet liners. The processes and procedures of Airphone communications techniques will known to those whom practice the art, therefore detailed descriptions are not necessary. The invention provides for means and method of utilizing Airphone cellular and PCS networks for the bi directional transmission of Microburst, Vburst and Macroburst data packets on Airphone cellular and PCS networks. The present invention can provide application specific terrorist deterrents, and prevention methods and means. The invention can provide effective anti bombing means and methods. Because the present inventions data protocols adhere to conventional cellular, PCS, and mobile satellite protocols; unconventional-emergency data packet transmissions will not be detected and deciphered by terrorist groups, for the conventional operations of Airphone cellular and PCS networks require constant control channel and digital access channel authentication and maintenance routines. The inventions emergency protocols can be easily hidden in seemingly conventional analog and digital control channel and

digital access channel be directional protocols. Additionally, the present inventions security related and anti-terrorist application communication systems that are installed in commercial jetliners, and military aircraft can be activated and controlled by law enforcement personnel, undetected by hostile forces. The Airphone network can be configured to support all the present invention application specific communications in much the same way a conventional cellular and PCS networks are configured.

The invention provides unique application specific services for the Livery Industry, in that a nano base site 511k, PDA 554K and application specific communicator 100k can be installed in a limousine 630. This system provides everything from the inventions debit prepay voice and data services, to GPS tracking services, and motor vehicle anti-theft systems. The invention can also provide unique anti-kidnapping and personnel protection services using GPS and other relative location systems.

The invention provides for unique Maritime application specific uses, in the same way it provides for air craft. An ocean going ship can be configured to utilize a nano base site 511h, a mini hub 543b and PDA 554h and application specific communicator 100h. This system can be configured to support the heretofore mentioned commercial application specific communicator and PDA communications. The ship can also send GPS packet data, via inventions mobile and Maritime satellite protocols, such as INMARSAT, Teledesic, Iridium, Globalstar, and AMSC satellite networks. The inventions Maritime applications include but are not limited to off shore anti piracy, ship container status and tracking services, ships personnel management and location means. Additionally,

the inventions Maritime mini hub 543b system can be used aboard ship, in the same way it is used by the inventions HMS network.

For example a GPS packet or other application specific packets need to be delivered immediately from the inventions Maritime mini hub 543b, or the HMS network mini hub to an application provider 120, as depicted in Fig. 24, the data packet is sent to from the mini hub 543 as depicted in Fig. 23, to the MCMS Teleport Hub 106, via any of the heretofore mentioned means and methods. However, if the packet does not need real time processing, it can be stored at the mini hub and packet bundled and sent to the MCMS Teleport Hub 106 for processing at a later time. When the GPS packet is sent in the form of a Microburst packet, a Vburst packet or Macroburst wideband data packet and sent to the MCMS Teleport Hub, it must be delivered to an application provider 120 in the means so designated by that provider, or by a wider more accessible means that delivers GPS information direct to the consumer, such as the CCAD-NET-TV network return 613 as depicted in Fig. 24. This return path can be a broadcom network as depicted in Fig. 6, 568 utilizing multi fiber optic or copper based broadcom channels 585, or via the internet 105 as depicted in Fig. 18.

Referring to Fig. 18 and 26. The invention provides unique Image Mail (IMAIL) or GPS mapping software 'snap shots, or many moving vinette sequences of relative positions of persons and objects via internet connected CCAD-NET TV consoles or personal computers. The invention's specialized MATV/CATV cable television headend equipment provides multi user access, so that CCAD-NET-TV operations that can be accessed via any TV set in the house or building, without any specialized apparatus located at each TV set or monitor.

The CCAD-NET-TV monitor 571b can provide any of the conventional cable television or satellite television services known in the art today. The invention provides the heretofore mentioned additional location services. For example, the monitor 571b is displaying a menu 596 that offers various options. For example a private user or business user, can purchase the inventions application specific GPS or other location means based communicators. These communicators are designed to be installed in motor vehicles, worn by family members, other persons, pets and other animate and inanimate objects. For example if a user has a motor vehicle anti theft and GPS location system installed in the family car, he can track its whereabouts by accessing the inventions specialized CCAD-NET internet server system 612 as depicted in Fig. 19, and Fig. 5. Referring to Fig. 26, the CCAD-NET TV console 583 and connected monitors 571b, 571c, 571d and 571e for example can be controlled by a conventional wireless remote, or via a conventional mouse system. Like a computer with graphic user interface (GUI), such as Microsoft Windows and others, the CCAD-NET-TV GPS location system, and messaging system can be operated in the same manner. Conventional WEB TV sets operate in this manner. The means and method of the WEB TV user interface operations are well known to those whom practice the art. Further detailed description of these operations is deemed unnecessary for the purpose of this disclosure.

Referring to Fig. 26, the user can access the CCAD-NET-DCS internet server system via the GUI menu 596 displayed on the CCAD-NET TV monitor 571b screen 594a. Through wireless remote means or mouse control means, the user can select a specific value added service. For example the user wants to locate the family car 597. He may have allowed his teenage son to use the car and

wants to find out where it is. Through the GUI menu 596, the user sends a location request, via the internet to the inventions specialized internet server system. Referring to Fig. 5, once the location request has arrived at the CCADNET server system 612, it checks the customers service profile and verifies that the customer has subscribed to many location, status response and application specific messaging services. The server relays the location request to comparitive data base (CDB) terminal 169. The CDB 169 receives the request verifies the motor vehicles GPS and anti theft communicators CIN, CSN number, and then sends a currently serving network location request to the inventions home location register/data clearing register (HLR/DCR) 162. If the vehicle application specific system is on line and active, the DCR will verify if it currently active, if not, the CDB 169 sends an inactive status message back to the CCAD-NET server system 612, and either sends an inactive message to the user via his CCAD-NET-TV console and monitor screen. If the user so chooses, he can have his service configured to report the last known location of the vehicle before it when inactive. The means and methods of cellular and PCS IS-41 automatic roaming procedures are known to those whom practice the art, therefore details of these means and methods will not be further disclosed. If the motor vehicle is active, or if the user wants the last known location before it went inactive the following processes and procedures occur. First of all if the motor vehicle is active, the CDB 169 sends an action or command request to the action data base (ADB) 119. Depending on whether the motor vehicle is operating in a conventional cellular or PCS network, a hybrid CCAD cellular/PCS network that uses CCAD-SAT base sites and its virtual network to add additional application specific data service capacity, a separate CCAD geo synchronous satellite communication based virtual network, a CCAD mesh node wideband data hybrid

mobile and stationary services network, a mobile satellite network, and others; a forward message is sent to the motor vehicle that causes it to respond with the heretofore mentioned GPS data packet. When the GPS packet is sent to the MCMS Teleport Hub and its contained network management subsystem 525. First of all the GPS data packet arrives at the HLR/DCR 162 via SS7 means 262 or internet means. The HLR/DCR relays the GPS data packet to the inventions specialized geographic or graphic information system (GIS) 591. This system takes the longitude and latitude data contained within the GPS data packet that was originally sent from the users motor vehicle and converts the data to GIS map display data. However, the invention uniquely prepares a 'snap shot' of the current location or last known location of the motor vehicle. Instead of providing a real time moving map display of current motor vehicle location, which requires a great deal of complexity, use of GIS and server system capacity, the invention provides an immediate snap shot or 'still' image of relative location of the motor vehicle. This still image looks just like a GIS moving map display, and provides the same utility. This snap shot image is prepared by the inventions unique GIS map software in standard HTML and JPEG. MPEG, or other acceptable image standard. HTML, JPEG, MPEG, are terms that represent systems well known to those whom practice the internet server and web page art, therefore further disclosure is deemed unnecessary for the purposes of this disclosure. Referring to Fig. 5, once the inventions snap shot location image of the motor vehicles current location complete, than it is relayed to the CCADNET server system 162. The CCAD-Net server system 162, then relays the prepared snap shot image to users CCAD-NET TV console and monitor via the CCAD-NET return 611. If the users CCAD-NET TV console interconnected on the internet, the motor vehicle location snap shot is sent via the internet. If the users console is interconnected on

a host multi service broadcom network it is sent via that network. The snap shot can be sent via a satellite based internet or broadcom link via the inventions CCAD-SAT network, via one its nano base site systems, represented by inventions satellite system means 614, as depicted in Fig. 18.

In Fig. 18, the CCAD-NET-GATEWAY 555b is configured as a set top box base site. Alternatively, PDA 554 can become a remote control device that can communicate with the CMS over the DBS network, thereby obviating the requirement of a set top box for the DBS. The invention provides another service that is important for the Direct Broadcast Satellite Industry, bi directional DBS subscriber value added data services. These services are managed by the invention's MCMS Teleport Hub 106, and this specific application data is transmitted and received via the invention's analog and digital control channel, digital access channel, authentication channel, signaling channel, IS-136 TDMA DCCH, IS 95 CDMA DCCH, GSM TDMA DCCH, and broadcast control channel BCCH; data protocols and procedures. DBS satellites only broadcast video, music, telex, customer authentication in one direction. Besides satellite based internet services, the inventions base site 555b and antenna 614 receives DBS direct satellite system (DSS) services such as Direct TV and others. The invention provides use access to value added service via the heretofore mentioned control channel means. Such services as DBS satellite pay-per-view movie, digital music programming, and other special event programming requests and other DBS service authorizations can be sent to the DBS satellite control center 635, that is a point of presence on the internet. The inventions set top box base site 555b, acts as the conduit to conventional cellular, PCS and wideband networks. Additionally, the base site 555b can be used in the inventions satellite

based network, and mesh node hybrid network. A conventional DSS DBS satellite receiver can be modified and upgraded to communicate directly with cellular, PCS, and wideband data networks. These networks act as a conduit for the inventions MCMS Teleport Hub 106, whereby this center forwards DBS customers value added service requests to the DBS control center 635. Conversely, the DBS control center can forward authentication and service authorization to the modified DSS satellite receiver via the inventions control channel means and methods. Additionally, the invention can deliver text messaging and other relevant data to the DBS satellite receiver/consumer unit. The DBS receiver can also be modified to receive CCAD-NET-TV location and messaging services.

Referring to Fig. 26. The CCAD-NET TV console 583c, sends the image to the monitor's 571c circuitry means, and is displayed via cathode ray tube (CRT) or LCD display means 594c. The image depicts a map display that is readily familiar to the user, for it depicts the downtown area of his town . The image further shows the position of 'Your Car' 595, and it is located at the corner of Main and 2nd Street. A data and time code is provided, that indicates to the user that this was the exact time and date that the motor vehicle sent the GPS data packet. Now that the user knows the current or last known location of his car, he can trash the file or store it, or print it out if his console is equipped with printer management and connection means. The user can opt for automatic retrieval of location related snap shot images, and the CCAD-NET server system can periodically send location update images and image waiting indicators to the users personal computer, CCAD-NET TV console, or specially configured PDA.

Referring to Fig. 25, the PDA 554, can be configured to receive the inventions snap shot images via the inventions Vburst data packets, and mesh node wideband data packets. These packets can support large data file transfers. Typically graphic images require relatively large amounts of data. However, the inventions relative location snap shots can easily transmitted to the inventions PDAs, via cellular, PCS and mobile satellite based forward traffic channels. For example, a user can be operating in any of the heretofore mentioned CCAD-NET-DCS networks, send a location request and receive the inventions relative location snap shot mapping image, by selecting CCADNET TV services 587 on his PDA 554 screens 593 GUI menu selection. This operates similarly to how the CCAD-NET TV console and monitor user retrieves relative location information.

Referring to Fig. 26, the menu selection 596 reveals other location and messaging options. For example if the user's son, Steve Jr. 598, is wearing one of present inventions personnel location communicators, he can be located in same means method as the family car was located. The user's elderly uncle Fred is an outpatient whom suffers memory loss, so the user's opted have him wear one of the present inventions personnel location devices. The user so chooses to find out where is Uncle Fred by using the menu to locate Uncle Fred 599. The snap shot image is returned in the heretofore mentioned means and is displayed on the monitor 571e CRT screen 594d. Uncle Fred is located on Main Street near 1st Street 608. If the user's pet dog Fido is wearing the inventions pet locator, the order can be given to locate Fido 600. The user may want to locate a Fedex package, or UPS package or U.S. Mail package. If package carriers truck is equipped with one of the inventions GPS location communicators, and the present inventions MCMS Teleport Hub is interfaced with the package carriers;

package management and location data base. The user's FEDEX package can be located utilizing the inventions means and methods. Therefore a snap shot image of the current location of the package can be provided, even if the package is located within the building of a package transfer depot. By combining a package carrier's conventional tracking software, and logistical management software, with the inventions heretofore described GPS mobile location system, a new package management system is created. This system is immediately accessible to any user that interfaced with the present inventions CCAD-NET-DCS network.

Referring to Fig. 26, the CCAD-NET TV user can also send pages and messages to CCAD-NET-DCS application specific communicators and PDSs. The user simply brings up the selection menu depicted on the CRT screen display 594a of the monitor 571b, and selects to send a message 636. An alpha message can be typed out and sent, or a stored predetermined message can be sent. The user can also send just a numeric message or page to the application specific communicator or PDA user. The messages are sent to the inventions MCMS Teleport Hub via the internet, and forwarded to the currently serving CCAD-NET-DCS network area via previously disclosed means and methods.

Referring to Fig. 26, the invention can provide Image Mail 619. Image Mail can contain graphic images of Close Circuit Television (CCTV) systems used for security monitoring of buildings, streets and other indoor and outdoor environments. Many CCTV video cameras, and CCTV based security systems used in the art today, provide object movement alarms. For example, if a single CCTV security video camera detects movement in an unauthorized area, the camera controller sends an alarm notice via its local network to the manned or

unmanned control center. The center then displays the image immediately. The inventions GIS snap shot system can be interfaced via the heretofore disclosed image transfer means and the CCTV security camera image can be sent to a remote personal computer, the inventions PDA, or the inventions CCAD-NET TV console and monitor, or to an application provider such as a private or public law enforcement agency.

Image Mail can be used by correctional agencies to identify persons confined to home arrest or keep away programs. The invention can provide GPS data based snap shot images in the heretofore disclosed manner, to parole and probation facilities. These facilities can utilize specially configure personal computers, and CCAD-NET TV monitors and consoles to locate home arrest subjects, and keep ways. A parole officer, probation officer or other law enforcement officer can be equipped with the inventions PDA to locate a home arrest subject, by simply transmitting a snap shot request to the currently serving CCAD-NET-DCS network, and having that network respond sending the relative location snap shot image or text message to the PDA to either show or spell out in text form a home arrest subject's current location.

Referring to Fig. 18, a person's home 505, office 506 and local police agencies 507 can be equipped with the inventions user interface system. There is also provided a specialized means of providing text messages and Image Mail to broadband cable television users. The CCAD-NET-GATEWAY 555b can also be a specialized cable TV set top box. This set top box can be configured to provide conventional cable TV services and the inventions unique messaging and location services. By modifying a conventional set top box by adding a specialized text

and image producing generator, any cable TV network can provide the inventions disclosed systems and services. The inventions uses pay-per-view service authorization code data strings or packets to add and deliver text messages. Pay-per-view authorization means and methods are familiar to those whom practice the art, therefore a detailed description of this conventional procedure is omitted for the purposes of this disclosure. The inventions specialized cable television text and image delivery system can provide the means and method of displaying messages and images on any TV set screen. The invention uses special sub channel means to send the text message to the TV screen while the user is viewing a program on any given channel. The inventions generator, creates an overlay image, such as video keyed, or blue screen processed image. In essence, the text or graphic image; be it a GPS location snap shot, a CCTV security system snap shot of other disclosed images, can be displayed momentarily over the image that is being displayed on the users TV set monitor screen. Referring to Fig. 18, the MCMS Teleport Hub 106 can be connected via internet, broadcom or other means to a host cable TV network headend 574. The inventions text messages and the snap shot images can be sent to the set top box or CCAD-NET-gateway 555b via various analog or digital data means, and the image or text message can be generated by the inventions method and apparatus and displayed on the users, or message callers conventional TV screen without modifying the TV or the host cable television network.

The invention provides for specialized portable and motor vehicle mounted base site configurations. These specialized base site configurations can be used by police and military organizations. Referring to Fig. 15 and Fig. 19, there is provided CCAD-SAT based nano base site 375, and 375b. In Fig. 15, the

nano base site 375b is configured for specialized mobile applications. It is equipped with a fold out satellite antenna array 376, a solar electric panel 106, and carrying handle 381 and a telescopic cellular or PCS analog or digital control channel sector antenna. This single sector base site can be configured to operate with all known cellular and OCS frequencies 372. This portable base site can operate in geographic areas where conventional cellular or PCS service does not exist, or where it does exist. This base site 375b, can be set up easily. Once it is physically set up, its specialized electronics come into play.

Referring to Fig. 17, the inventions portable base has an LCD display 382. The display provides user interface to menu driven controls, via a PC type command prompt 383. The display also provides a solar power and battery level indicator 385.

After the portable base site is set up, and the telescopic antenna is extended the following automatic procedures occur. The base site scans all relevant radio frequencies, and looks for all known analog and digital cellular and PCS control channel carrier frequencies 386. If a cellular or PCS carrier is detected 391, the base site scans for carrier standard detect 387. If a relevant standard is detected 393, the base site scans for any control channel frequency or specific channel detect 389. If there are any existing control channels detected, yes 397, the base site sets the sector cell transceiver to another channel 399 that does not cause interference with the detected control channel frequencies. Then the base site commences relevant forward overhead, forward paging and forward application specific messaging transmissions 500. Once the base site detects the presence of the inventions application specific communicator(s) 100 or a PDA

354, it then transmits received VSAT network originated messages 501. The base site then can also receive CCAD-NET-DCS messages and convert them for transmission to inventions CCAD-NET satellite based network. In another scenario, there may be no carrier detect 392, no existing cellular or PCS standard detect 394, and no analog or digital control channel detect 396 and no traffic channel detect 398. If there is no channel detect 390. Then the base site can randomly assign an operational standard, and a designated operational bi directional control channel, digital access channel, digital traffic channel or wideband data channel.

Referring to Fig. 16, a CCAD-NET-DCS base site 379 can be configured and installed in a motor vehicle such as this depicted van 378. There is provided a single or multiple sector cell 377. This system operates exactly like the disclosed portable base site. Both the portable base site and motor vehicle mounted base site can support data rates of up to 155 Mbps 567 when transmitting packets and packet bundles to a geosynchronous satellite 107. This high data rate can be used with conventional Ku band uplink frequencies 374 and downlink frequencies 373. While the inventions application specific communicators and PDA cannot support 155 Mbps data rates, these same base sites can be configured to provide specialized network to network data links.

Referring to Fig. 20, and Fig. 21, the invention provides specialized CCAD-NET-DCS inter network and intra network data links. In Fig. 20, the CCAD-NET-DCS network gateway base site 624, acts as an interface to a public or private SS7 network 529. This gateway provides direct access to conventional cellular and PCS based SS7 networks. The inventions application specific

communicators 100 and PDAs 554 can directly access any SS7 network node via this gateway. This gateway can also receive and transmit the inventions specialized SS7 base space segment/air interface protocols meant for user communicators and PDAs. This gateway can also be used to act as an SS7 network interface, whereby other of the present inventions application specific networks can send information to and from this gateway via a geo synchronous satellite 107, from any point on the Face of the Earth. The outlink or down link 373 and return link of uplink 374 can support the inventions specialized VSAT 64Kbps data packets and packet bundles. This base site is a point of presence on a private or public SS7 network with its own global, cluster and node address. Conversely, there is provided a cellular or PCS cell node gateway 530 as shown in Fig. 21.

Referring to Fig. 21, cellular or PCS portion of the CCAD-NET-DCS base site 110, represented by sector cells; 122, 123 and 124. There is provided multiple sector receivers 227, 228 and 229, and sector transmitters 331, 332 and 333. These integrated components serve to support the inventions specialized SS7 air interface protocols that are being transmitted to and from user application specific communicators and PDAs, and therefore relayed to other S77 nodes directly from the inventions application specific communicators and PDAs . This base site 110, there fore acts as a cellular and PCS node gateway 530, with its own SS7 global, cluster and node address.

CLAIMS

What is claimed is:

1. A method for communicating messages between a communicator and a central monitoring station over a mobile communications network that includes a voice channel and a control channel, wherein the voice channel conveys data messages and the control channel conveys control messages that manage access to and use of the voice channel, the method comprising the steps of:

a) obtaining a message at the communicator, the message comprising application specific data;

b) encoding the message in a sequence of digits associated with a control message to create an encoded message;

c) encoding a remote feature control request in the sequence of digits associated with the control message to invoke the forwarding of the sequence of digits, including the encoded message, by a telecommunications switching center upon detecting the remote feature control request;

d) transmitting the control message and associated sequence of digits from the communicator to a base station over the control channel, bypassing the voice channel;

e) transmitting the control message and associated sequence of digits from the base station to the telecommunications switching center via a satellite communication channel;

f) detecting the remote feature control request at the telecommunications switching center;

g) forwarding the remote feature control request and the encoded message over a communications channel to the central monitoring station in response to detecting the remote feature control request; and

h) decoding the encoded message to retrieve the application specific data.

2. The method of claim 1, wherein the step of obtaining a message at the communicator includes the steps of:

a) transmitting the message from a remote monitoring device to the communicator; and

b) receiving the message at the communicator.

3. The method of claim 2, wherein the remote monitoring device comprises an alarm system, and the step of receiving the message at the communicator comprises the step of receiving data specifying a status of an alarm system at the communicator.

4. The method of claim 2, wherein the remote monitoring device comprises a tracking system, and the step of receiving the message at the communicator comprises the step of receiving tracking data from the tracking system at the communicator.

5. The method of claim 2, wherein the remote monitoring device comprises a utility meter, and the step of receiving the message at the communicator comprises the step of receiving a reading from the utility meter at the communicator.

6. The method of claim 2, wherein the remote monitoring device is a two-way paging device, and the step of receiving a message at the communicator comprises the step of receiving a response to a page from a two-way paging device.

7. The method of claim 1, wherein the step of encoding the message in a sequence of digits associated with a control message comprises the step of encoding the message in a sequence of digits associated with a call origination message.

8. The method of claim 7, wherein the step of encoding a remote feature control request in the sequence of digits associated with the control message to invoke the forwarding of the sequence of digits, including the encoded message, by a telecommunications switching center upon detecting the remote feature control request, comprises encoding a remote feature control request in the sequence of digits associated with the call origination message to invoke the forwarding of the sequence of digits, including the encoded message, by the telecommunications switching center upon detecting the remote feature control request.

9. The method of claim 8, wherein the step of transmitting the control message and associated sequence of digits from the communicator to a satellite base station over the control channel, bypassing the voice channel, comprises the step of transmitting the call origination message and the associated sequence of digits from the communicator to the satellite base station over the control channel, bypassing the voice channel.

10. The method of claim 11, wherein the steps of detecting the remote feature control request at the telecommunications switching center and forwarding the remote feature control request and the encoded message over a communications channel to the central monitoring station in response to detecting the remote feature control request comprises the steps of detecting the remote feature control request at a cellular mobile radio switching center and forwarding the remote feature control request and the encoded message over at least one inter

cellular serving area link between the cellular mobile radio switching center and the central monitoring station in response to detecting the remote feature control request.

11. The method of claim 10, wherein the inter cellular serving area link between the cellular mobile radio switching center and the central monitoring station operates according to the signaling system 7 (SS7) protocol standard.

12. A method for communicating messages between a cellular mobile radio (CMR) communications device and a central monitoring device over a communications network that includes wireless digital traffic channels, satellite communication channels, and inter cellular serving area network channels, wherein the digital traffic channels comprise data traffic channels for transmitting voice and data signals and a control channel for transmitting control signals that manage access to and use of the data traffic channels, the method comprising the steps of:

a) inserting a message comprising application specific data in a sequence of digits to be transmitted by the CMR communications device in conjunction with a transmission of a call origination message;

b) encoding a remote feature control request in the sequence of digits to invoke the forwarding of the sequence of digits, including the message, by a CMR switching center upon detecting the remote feature control request;

c) transmitting the call origination message and the sequence of digits from the CMR communications device to a base station over the control channel, bypassing the voice channels, the call origination message specifying a mobile identification number (MIN) identifying the CMR communications device;

d) transmitting the call origination message and the sequence of digits from the base site to the CMR switching center over a satellite communications channel;

e) analyzing the call origination message and the sequence of digits at the CMR switching center and detecting the remote feature control request;

f) forwarding the remote feature control request and the message to the central monitoring device over an inter cellular serving area network channel, in response to detecting the remote feature control request, the inter cellular serving area network channel determined by the MIN;

g) receiving the remote feature control request and the message at the central monitoring station; and

h) extracting the message comprising application specific data.

13. The method of claim 12, wherein the step of extracting the message comprising application specific data further comprises the step of forwarding the application specific data to an application specific facility.

14. The method of claim 13, comprising the following steps, before the step of inserting a message comprising application specific data in a sequence of digits,

a) transmitting the message from a remote monitoring device coupled in communication with the CMR communications device; and

b) receiving the message at the CMR communications device.

15. The method of claim 14, wherein the remote monitoring device comprises an alarm system, and the step of receiving the message at the CMR communications device comprises

the step of receiving data specifying a status of an alarm system at the CMR communications device.

16. The method of claim 14, wherein the remote monitoring device comprises a tracking system, and the step of receiving the message at the CMR communications device comprises the step of receiving tracking data from the tracking system at the CMR communications device.

17. The method of claim 14, wherein the remote monitoring device comprises a utility meter, and the step of receiving the message at the CMR communications device comprises the step of receiving a reading from the utility meter at the CMR communications device.

18. The method of claim 14, wherein the remote monitoring device is a two-way paging device, and the step of receiving a message at the CMR communications device comprises the step of receiving a response to a page at the CMR communications device from the two-way paging device.

19. The method of claim 12, wherein the message comprises a response to an instruction received at the CMR communications device from the central monitoring device via the base station over a time division multiple access (TDMA) digital broadcast control channel.

20. The method of claim 19, wherein the TDMA digital broadcast control channel operates in accordance with global system for mobile communications (GSM) standards.

21. The method of claim 12, wherein the message comprises a response to an instruction received at the CMR communications device from the central monitoring device via the base station over a code division multiple access (CDMA) digital broadcast control channel.

22. A method for a communicator to communicate messages over a cellular telephone network that includes a voice channel and a control channel wherein the voice channel conveys data and the control channel conveys control signals that manage access to and use of the voice channel, and a satellite communications network, the method comprising the steps of:

encoding at the communicator a message having information unrelated to control and management of the voice channel for transmission over the control channel as control signals; and

transmitting the message as encoded using the control channel, bypassing the voice channel to a base site;

transmitting the message as encoded from the base site over a satellite communications channel to a ground station;

transmitting the message as encoded from the ground station over a communications channel to a central monitoring station.

23. The method of claim 22, further comprising an initial step of receiving the message from a remote monitoring system.

24. The method of claim 23, wherein the remote monitoring system comprises an alarm system, the step of receiving the message comprising receiving data specifying a status of the alarm system.

25. The method of claim 23, wherein the remote monitoring system comprises a tracking system, the step of receiving the message comprising receiving tracking data.

26. The method of claim 22, wherein the step of encoding the message comprises manipulating a Mobile Identification Number (MIN) of the communicator to include the message.

27. The method of claim 22, further comprising:

receiving the message as encoded over the communications channel at the central monitoring station; and

decoding the message.

28. The method of claim 27, wherein step of encoding the message comprises manipulating a Mobile Identification Number (MIN) of the communicator to include the message, and wherein the step of transmitting the message comprises transmitting the MIN as manipulated.

29. The method of claim 28, wherein the step of decoding the message comprises extracting the message from the manipulated MIN received via the communications channel.

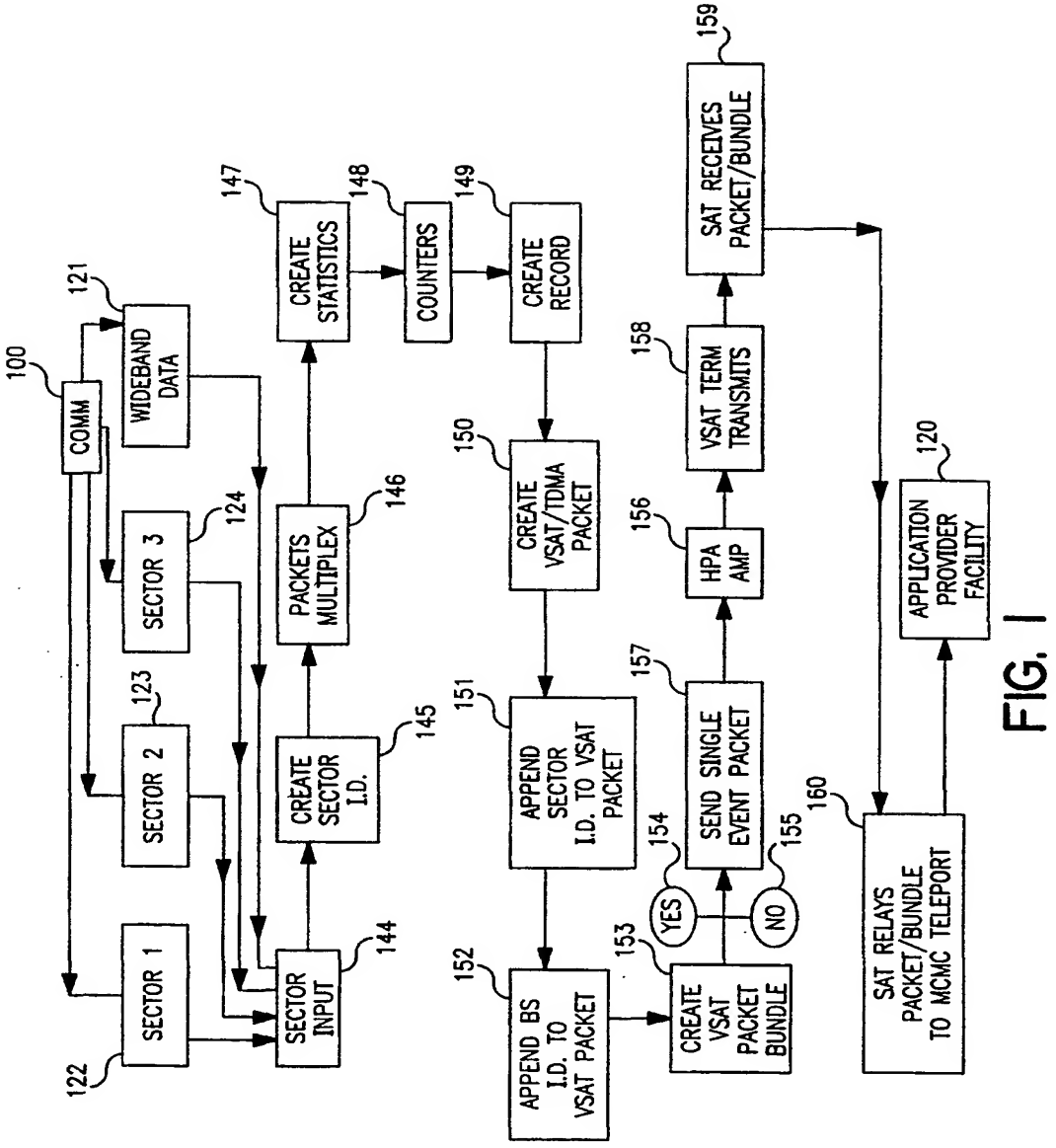

100
COMM
121
WIDEBAND DATA
122
SECTOR 1
123
SECTOR 2
124
SECTOR 3
144
SECTOR INPUT
145
CREATE SECTOR I.D.
146
PACKETS MULTIPLEX
147
CREATE STATISTICS
148
COUNTERS
149
CREATE RECORD
150
CREATE VSAT/TDMA PACKET
151
APPEND SECTOR I.D. TO VSAT PACKET
152
APPEND BS I.D. TO VSAT PACKET
153
CREATE VSAT PACKET BUNDLE
154
YES
155
NO
156
HPA AMP
157
SEND SINGLE EVENT PACKET
158
VSAT TERM TRANSMITS
159
SAT RECEIVES PACKET/BUNDLE
160
SAT RELAYS PACKET/BUNDLE TO MCMC TELEPORT
120
APPLICATION PROVIDER FACILITY

FIG. 1

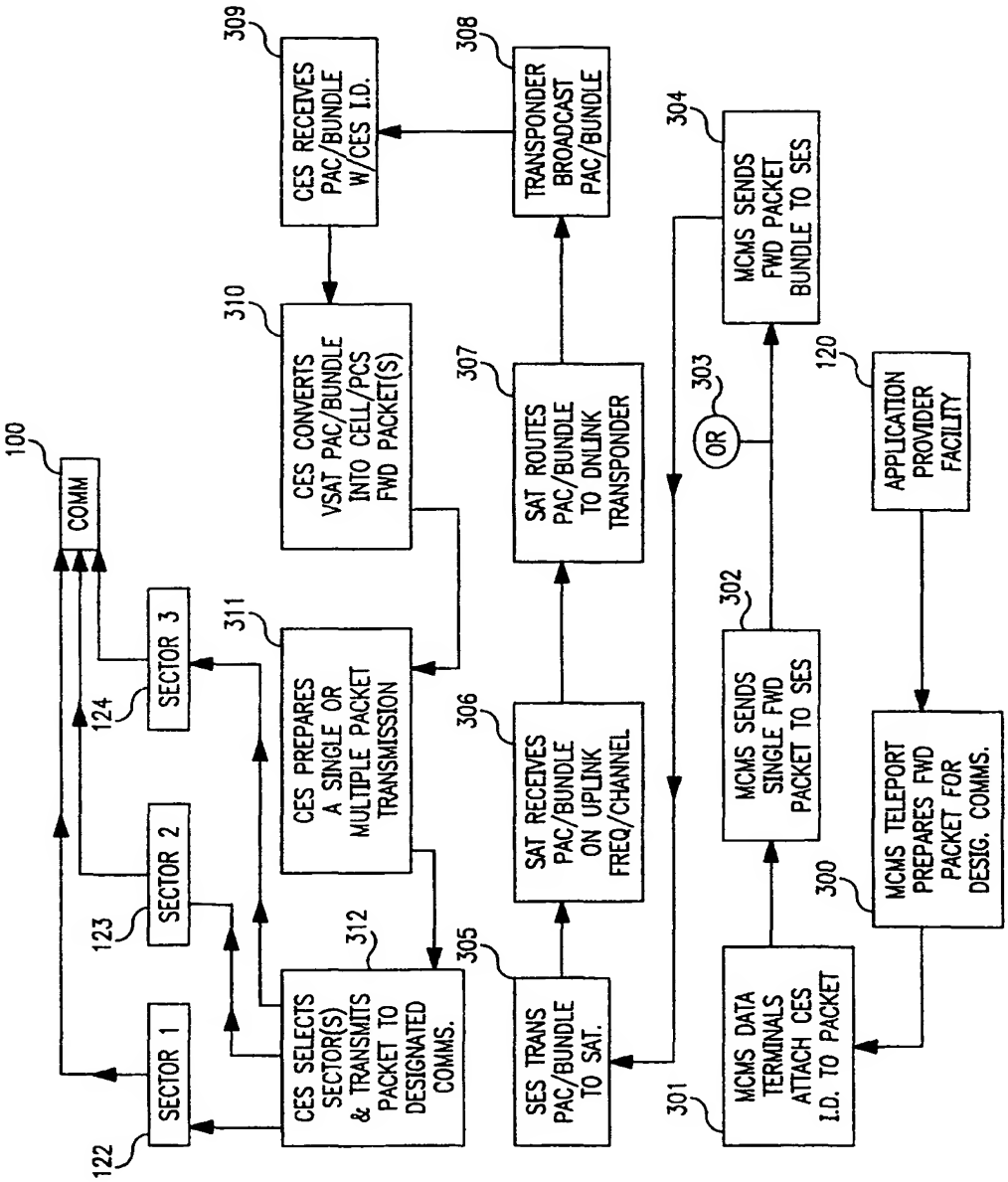

100
COMM
122
SECTOR 1
123
SECTOR 2
124
SECTOR 3
309
CES RECEIVES PAC/BUNDLE W/CES I.D.
310
CES CONVERTS VSAT PAC/BUNDLE INTO CELL/PCS FWD PACKET(S)
311
CES PREPARES A SINGLE OR MULTIPLE PACKET TRANSMISSION
312
CES SELECTS SECTOR(S) & TRANSMITS PACKET TO DESIGNATED COMMS.
308
TRANSPONDER BROADCAST PAC/BUNDLE
307
SAT ROUTES PAC/BUNDLE TO DNLINK TRANSPONDER
306
SAT RECEIVES PAC/BUNDLE ON UPLINK FREQ/CHANNEL
305
SES TRANS PAC/BUNDLE TO SAT.
304
MCMS SENDS FWD PACKET BUNDLE TO SES
303
OR
302
MCMS SENDS SINGLE FWD PACKET TO SES
301
MCMS DATA TERMINALS ATTACH CES I.D. TO PACKET
120
APPLICATION PROVIDER FACILITY
300
MCMS TELEPORT PREPARES FWD PACKET FOR DESIG. COMMS.

FIG. 2

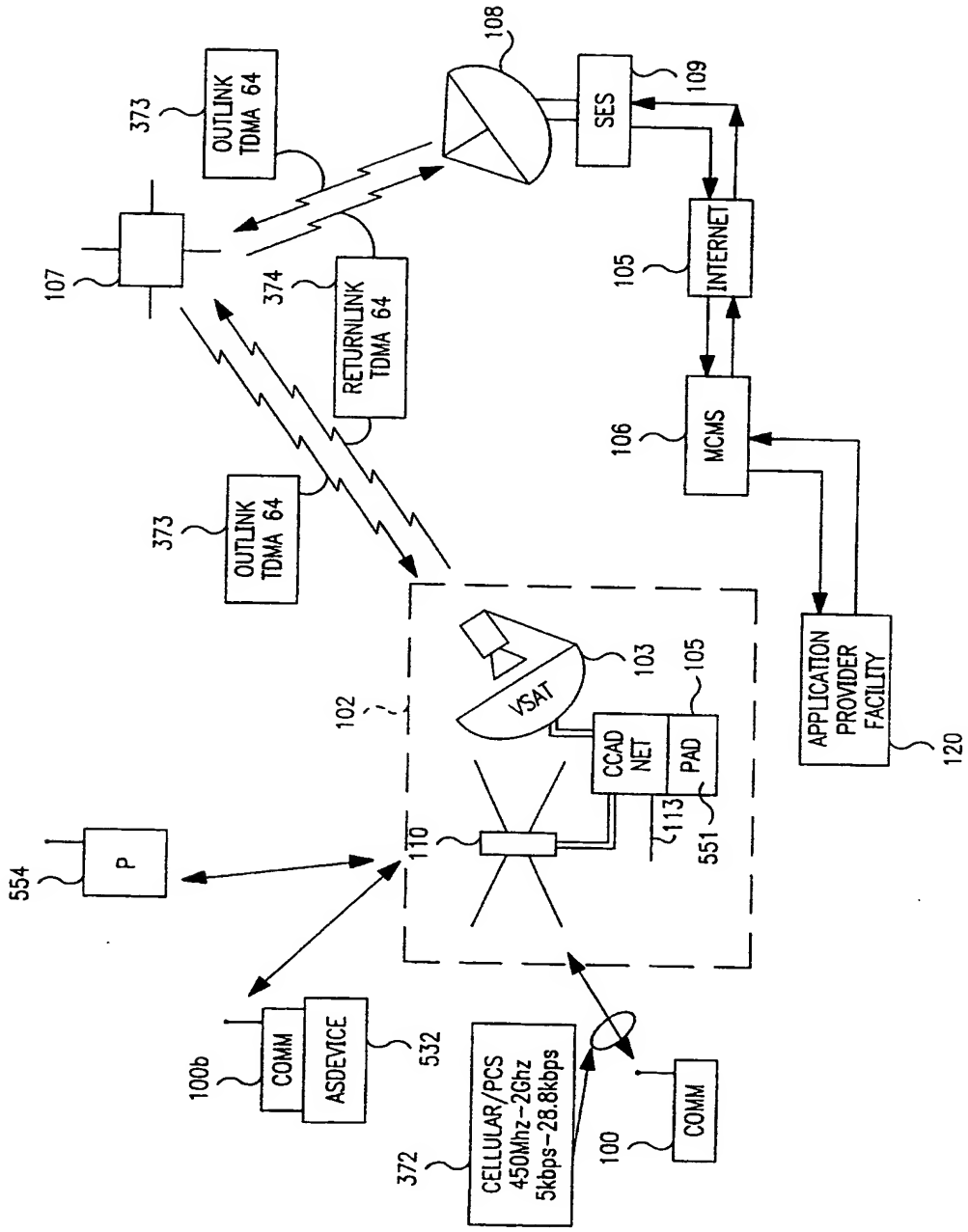
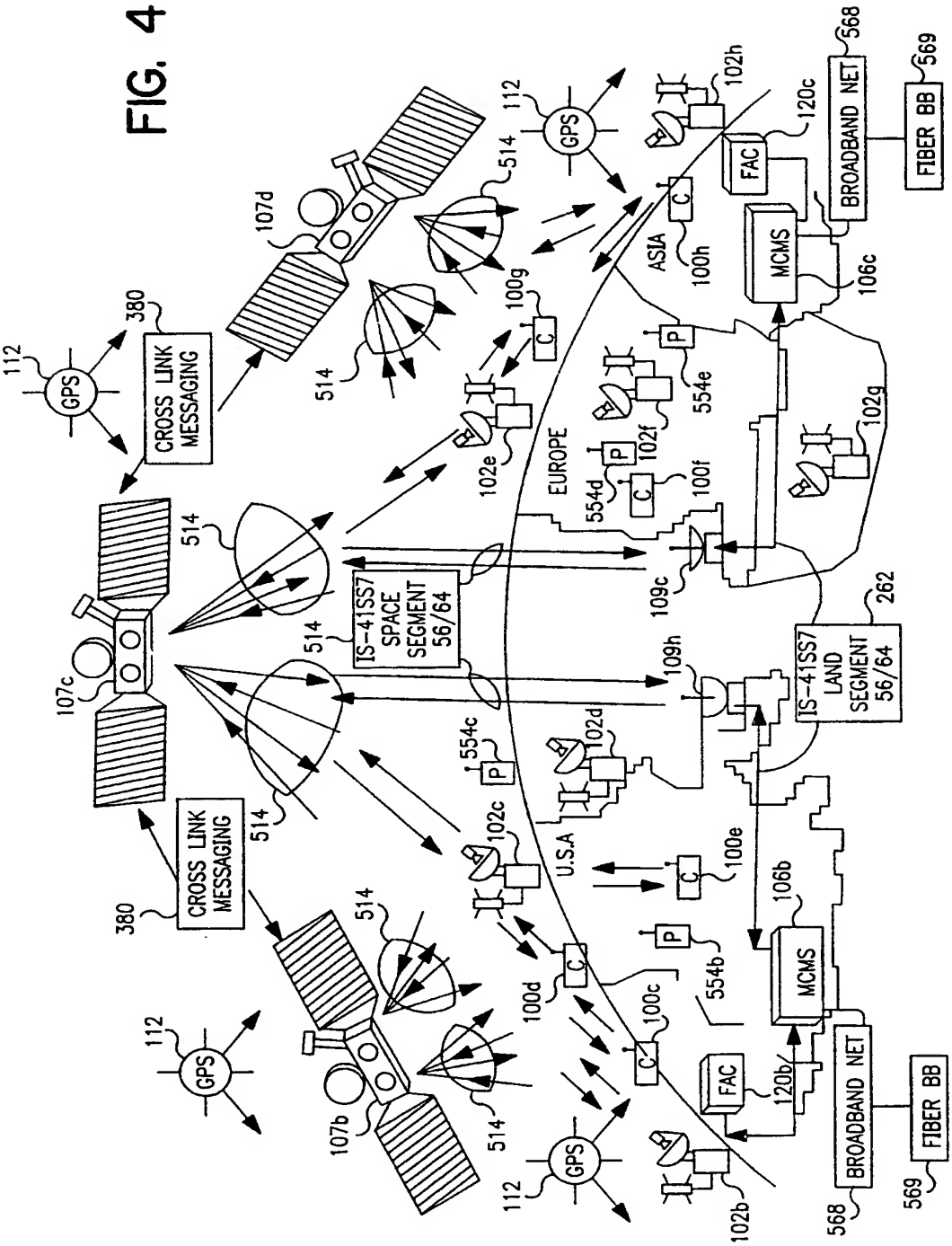

108
373
OUTLINK TDMA 64
SES
109
107
374
RETURNLINK TDMA 64
105
INTERNET
106
MCMS
373
OUTLINK TDMA 64
APPLICATION PROVIDER FACILITY
120
102
103
105
VSAT
CCAD NET
PAD
113
551
110
554
P
100b
COMM
ASDEVICE
532
372
CELLULAR/PCS 450Mhz-2Ghz 5kbps-28.8kbps
100
COMM

FIG. 3

FIG. 4


GPS
112
CROSS LINK MESSAGING
380
107d
107c
107b
514
IS-41SS7 SPACE SEGMENT 56/64
IS-41SS7 LAND SEGMENT 56/64
262
EUROPE
U.S.A
ASIA
100h
100g
100f
100e
100d
100c
102h
102g
102f
102e
102d
102c
102b
554e
554d
554c
554b
109c
109h
FAC
120c
120b
MCMS
106c
106b
BROADBAND NET
568
FIBER BB
569

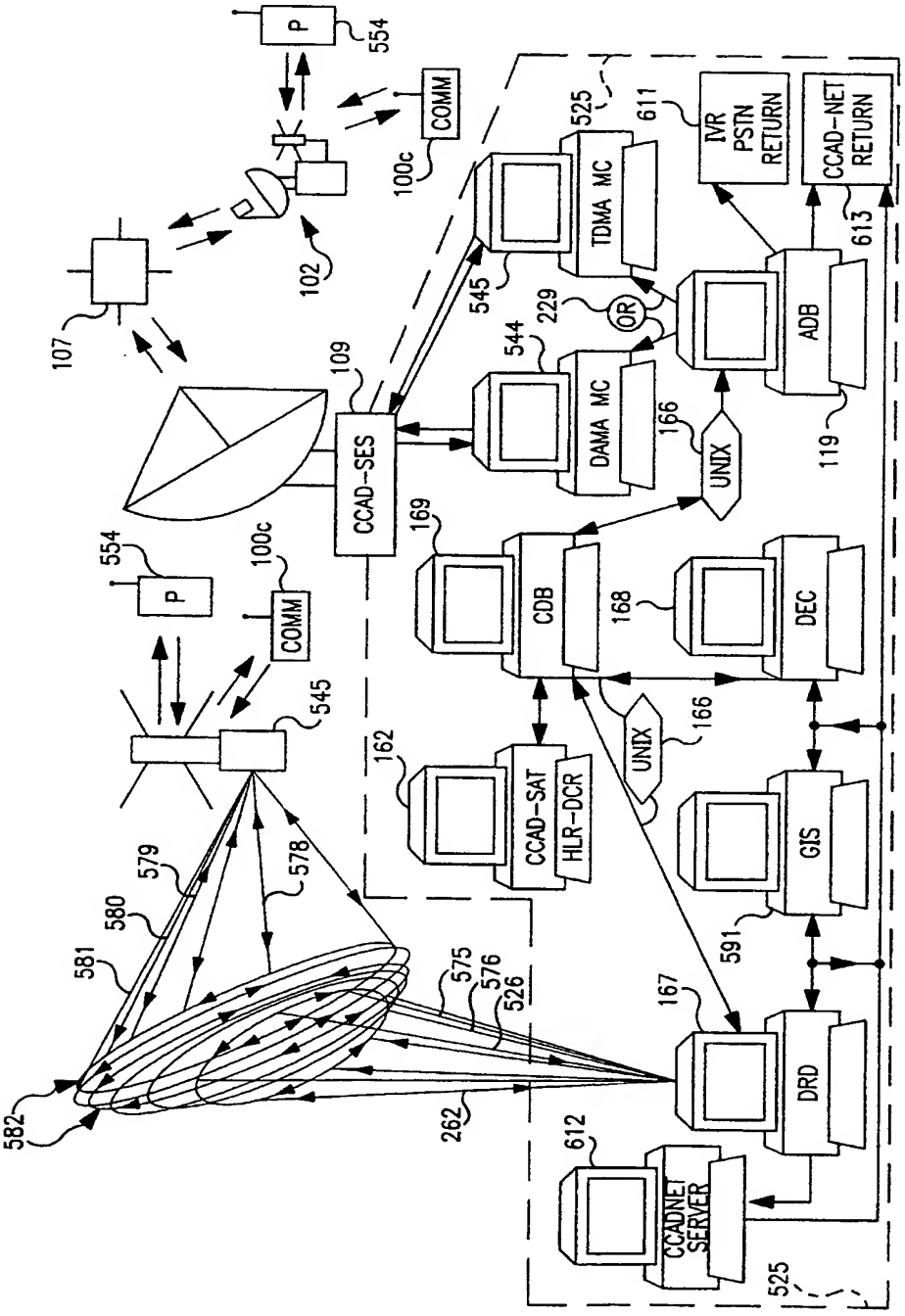
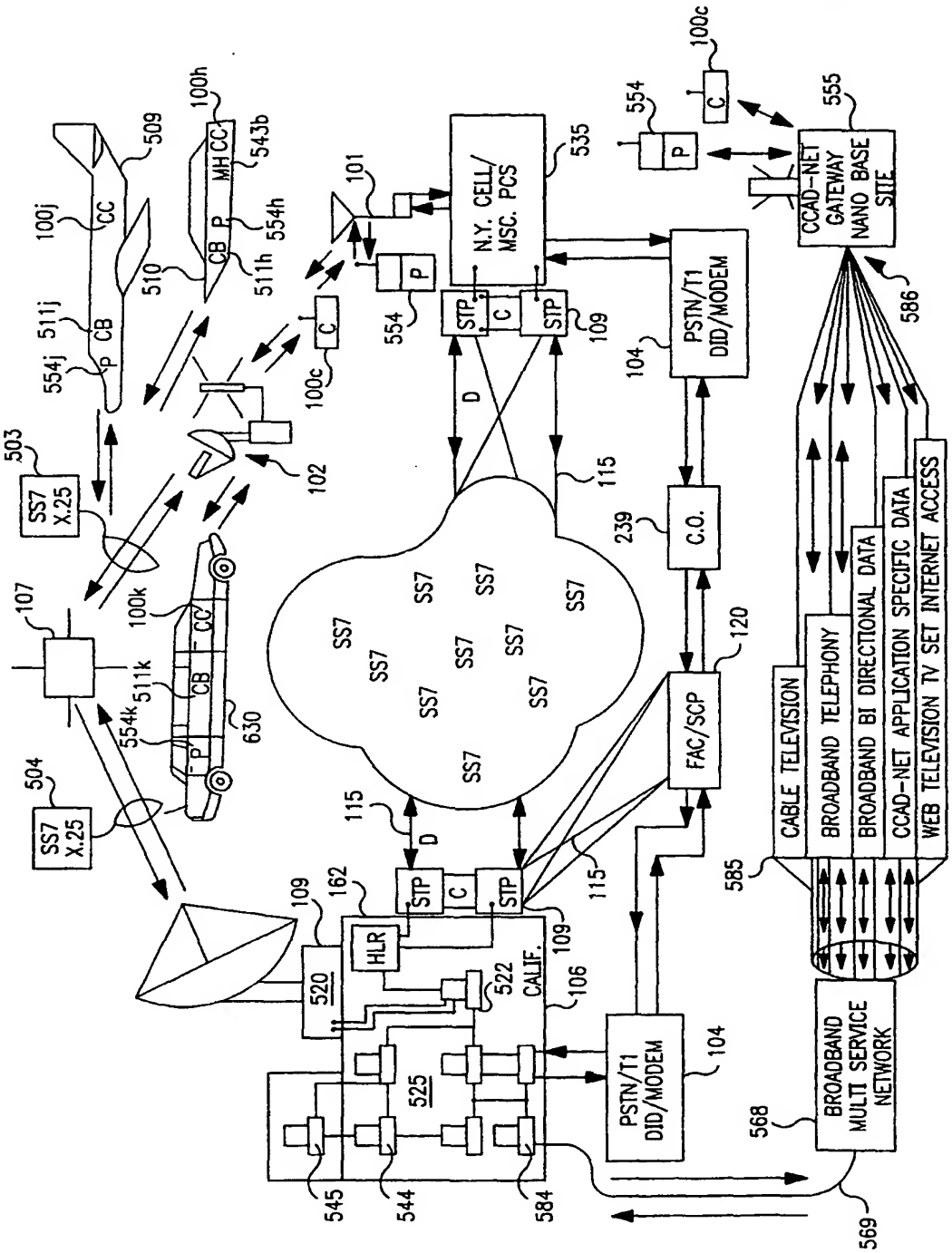

P
554
COMM
100c
102
107
109
CCAD-SES
525
611
TDMA MC
IVR PSTN RETURN
CCAD-NET RETURN
613
545
229
OR
544
DAMA MC
166
UNIX
ADB
119
169
CDB
168
DEC
162
CCAD-SAT HLR-DCR
GIS
591
579
578
580
581
575
576
526
167
DRD
582
262
612
CCADNET SERVER
525

FIG. 5

FIG. 6


100h
543b
MH CC
CB P
554h
511h
509
100j
CC
510
511j
CB
554j
P
503
SS7
X.25
107
100k
CC
CB
511k
554k
P
630
504
SS7
X.25
109
162
HLR
520
522
CALIF.
106
525
545
544
584
115
D
STP
C
STP
109
101
P
554
C
100c
N.Y. CELL/
MSC. PCS
535
554
P
C
100c
555
CCAD-NET
GATEWAY
NANO BASE
SITE
586
PSTN/T1
DID/MODEM
104
239
C.O.
FAC/SCP
120
SS7
CABLE TELEVISION
BROADBAND TELEPHONY
BROADBAND BI DIRECTIONAL DATA
CCAD-NET APPLICATION SPECIFIC DATA
WEB TELEVISION TV SET INTERNET ACCESS
585
PSTN/T1
DID/MODEM
104
BROADBAND
MULTI SERVICE
NETWORK
568
569

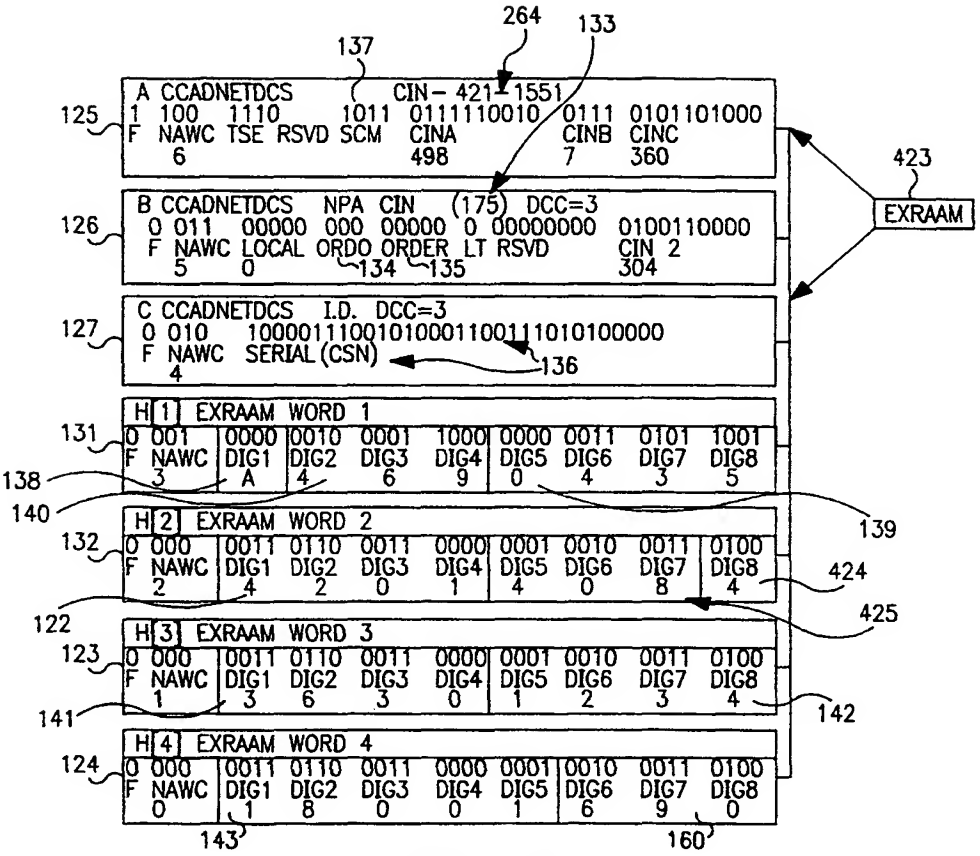

264
133
137
A CCADNETDCS CIN- 421-1551
1 100 1110 1011 0111110010 0111 0101101000
F NAWC TSE RSVD SCM CINA CINB CINC
6 498 7 360
125
423
EXRAAM
B CCADNETDCS NPA CIN (175) DCC=3
0 011 00000 000 00000 0 00000000 0100110000
F NAWC LOCAL ORDO ORDER LT RSVD CIN 2
5 0 134 135 304
126
C CCADNETDCS I.D. DCC=3
0 010 10000111001010001100111010100000
F NAWC SERIAL(CSN)
4
127
136
H 1 EXRAAM WORD 1
131
0 001 0000 0010 0001 1000 0000 0011 0101 1001
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
3 A 4 6 9 0 4 3 5
138
140
139
H 2 EXRAAM WORD 2
132
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
2 4 2 0 1 4 0 8 4
424
122
425
H 3 EXRAAM WORD 3
123
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
1 3 6 3 0 1 2 3 4
141
142
H 4 EXRAAM WORD 4
124
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
0 1 8 0 0 1 6 9 0
143
160

FIG. 7

FIG. 8

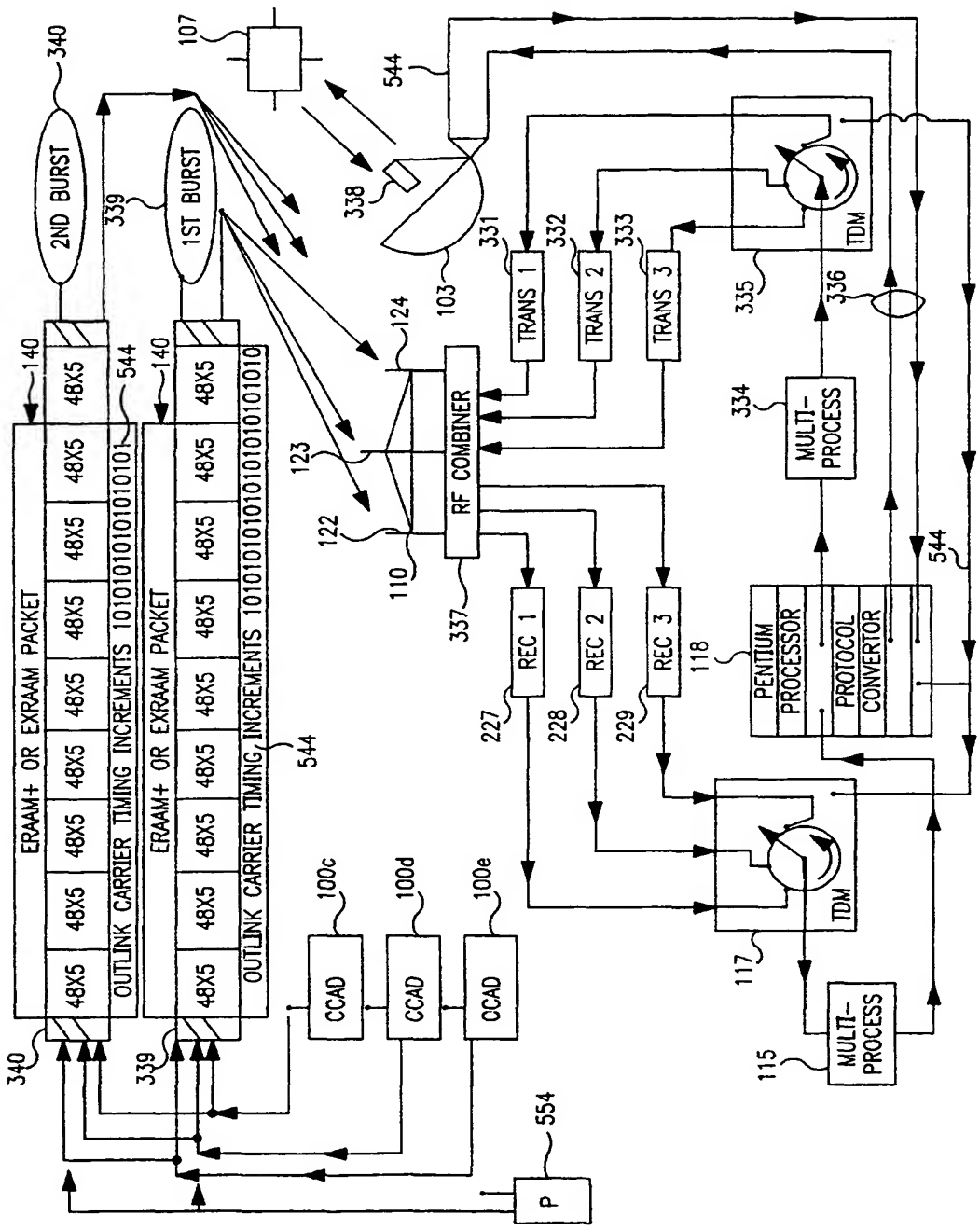
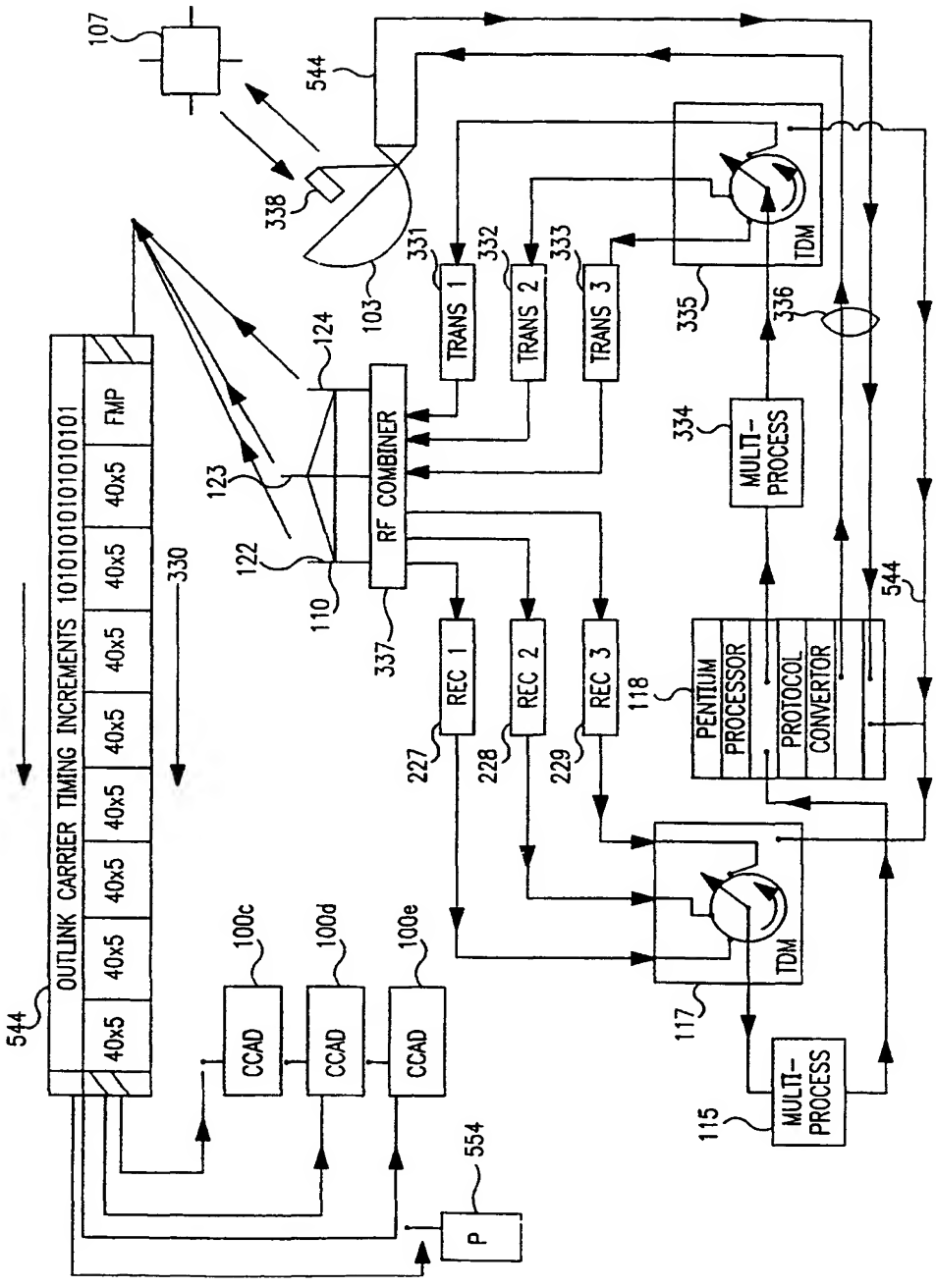

2ND BURST
1ST BURST
ERAAM+ OR EXRAAM PACKET
48X5
OUTLINK CARRIER TIMING INCREMENTS 10101010101010101
OUTLINK CARRIER TIMING INCREMENTS 10101010101010101010
CCAD
RF COMBINER
TRANS 1
TRANS 2
TRANS 3
REC 1
REC 2
REC 3
TDM
MULTI-PROCESS
PENTIUM PROCESSOR
PROTOCOL CONVERTOR
P
107
340
339
544
140
100c
100d
100e
338
331
332
333
103
124
123
122
110
337
227
228
229
118
335
336
334
117
115
554

FIG. 9


107
544
338
103
331
332
333
TRANS 1
TRANS 2
TRANS 3
335
336
TDM
124
123
122
110
RF COMBINER
334
MULTI-PROCESS
330
337
REC 1
REC 2
REC 3
227
228
229
118
PENTIUM PROCESSOR
PROTOCOL CONVERTOR
544
OUTLINK CARRIER TIMING INCREMENTS 10101010101010101
FMP
40x5
544
100c
100d
100e
CCAD
CCAD
CCAD
117
TDM
115
MULTI-PROCESS
554
P

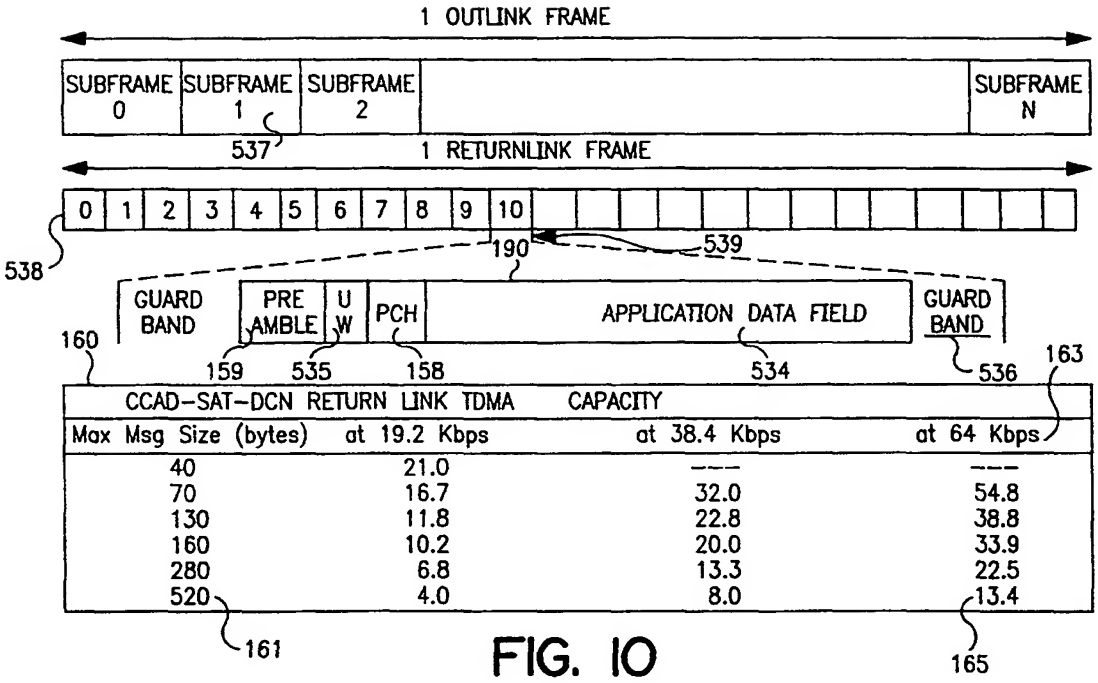
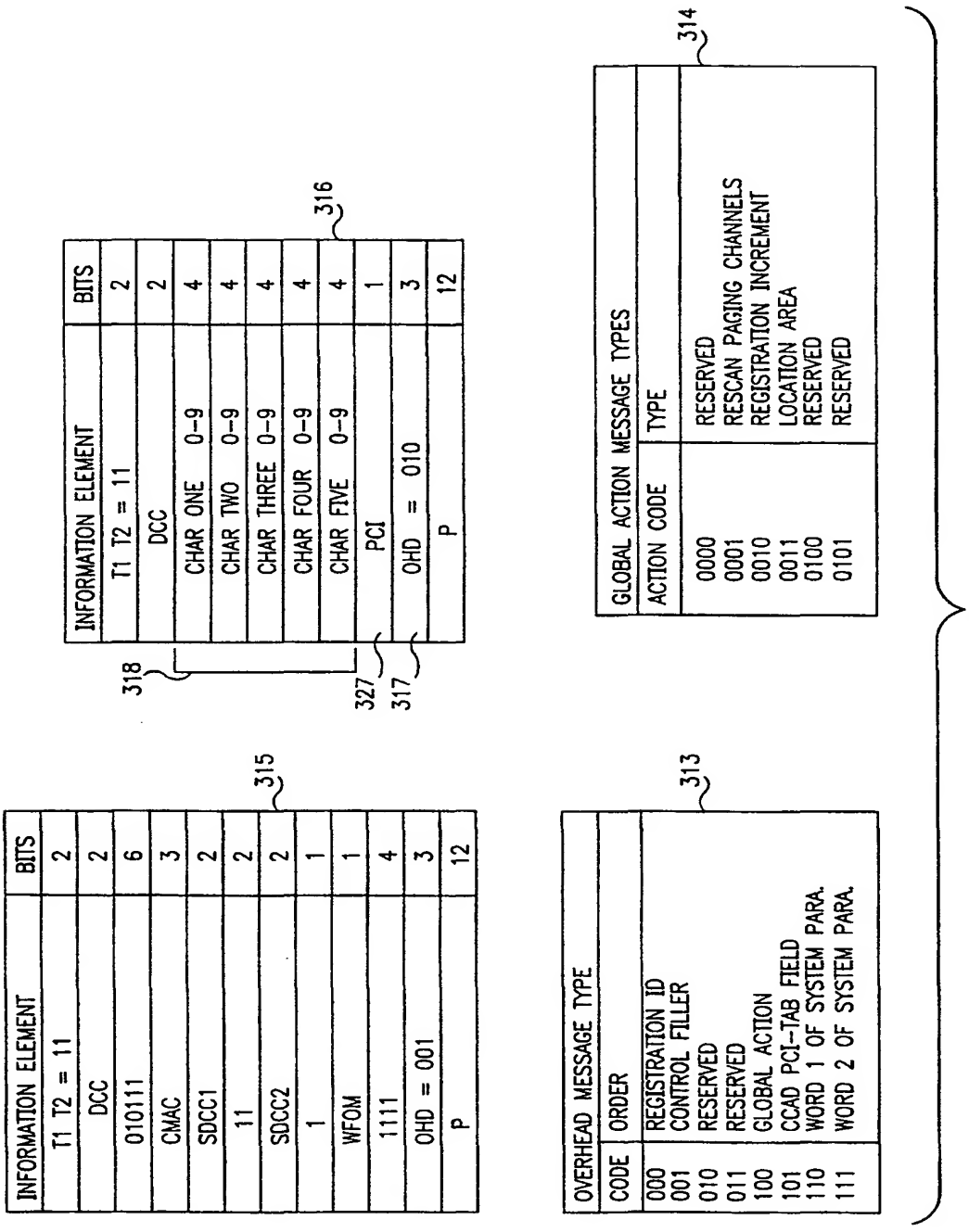

1 OUTLINK FRAME
SUBFRAME 0
SUBFRAME 1
SUBFRAME 2
SUBFRAME N
537
1 RETURNLINK FRAME
0 1 2 3 4 5 6 7 8 9 10
538
190
539
GUARD BAND
PRE AMBLE
U W
PCH
APPLICATION DATA FIELD
GUARD BAND
160
159
535
158
534
536
163
CCAD-SAT-DCN RETURN LINK TDMA CAPACITY
Max Msg Size (bytes) at 19.2 Kbps at 38.4 Kbps at 64 Kbps
40 21.0 --- ---
70 16.7 32.0 54.8
130 11.8 22.8 38.8
160 10.2 20.0 33.9
280 6.8 13.3 22.5
520 4.0 8.0 13.4
161
165

FIG. 10



INFORMATION ELEMENT	BITS
T1 T2 = 11	2
DCC	2
010111	6
CMAC	3
SDCC1	2
11	2
SDCC2	2
1	1
WFOM	1
1111	4
OHD = 001	3
P	12

315

INFORMATION ELEMENT	BITS
T1 T2 = 11	2
DCC	2
CHAR ONE 0-9	4
CHAR TWO 0-9	4
CHAR THREE 0-9	4
CHAR FOUR 0-9	4
CHAR FIVE 0-9	4
PCI	1
OHD = 010	3
P	12

316

318 327 317

OVERHEAD MESSAGE TYPE	
CODE	ORDER
000	REGISTRATION ID
001	CONTROL FILLER
010	RESERVED
011	RESERVED
100	GLOBAL ACTION
101	CCAD PCI-TAB FIELD
110	WORD 1 OF SYSTEM PARA.
111	WORD 2 OF SYSTEM PARA.

313

GLOBAL ACTION MESSAGE TYPES	
ACTION CODE	TYPE
0000	RESERVED
0001	RESCAN PAGING CHANNELS
0010	REGISTRATION INCREMENT
0011	LOCATION AREA
0100	RESERVED
0101	RESERVED

314

FIG. 11

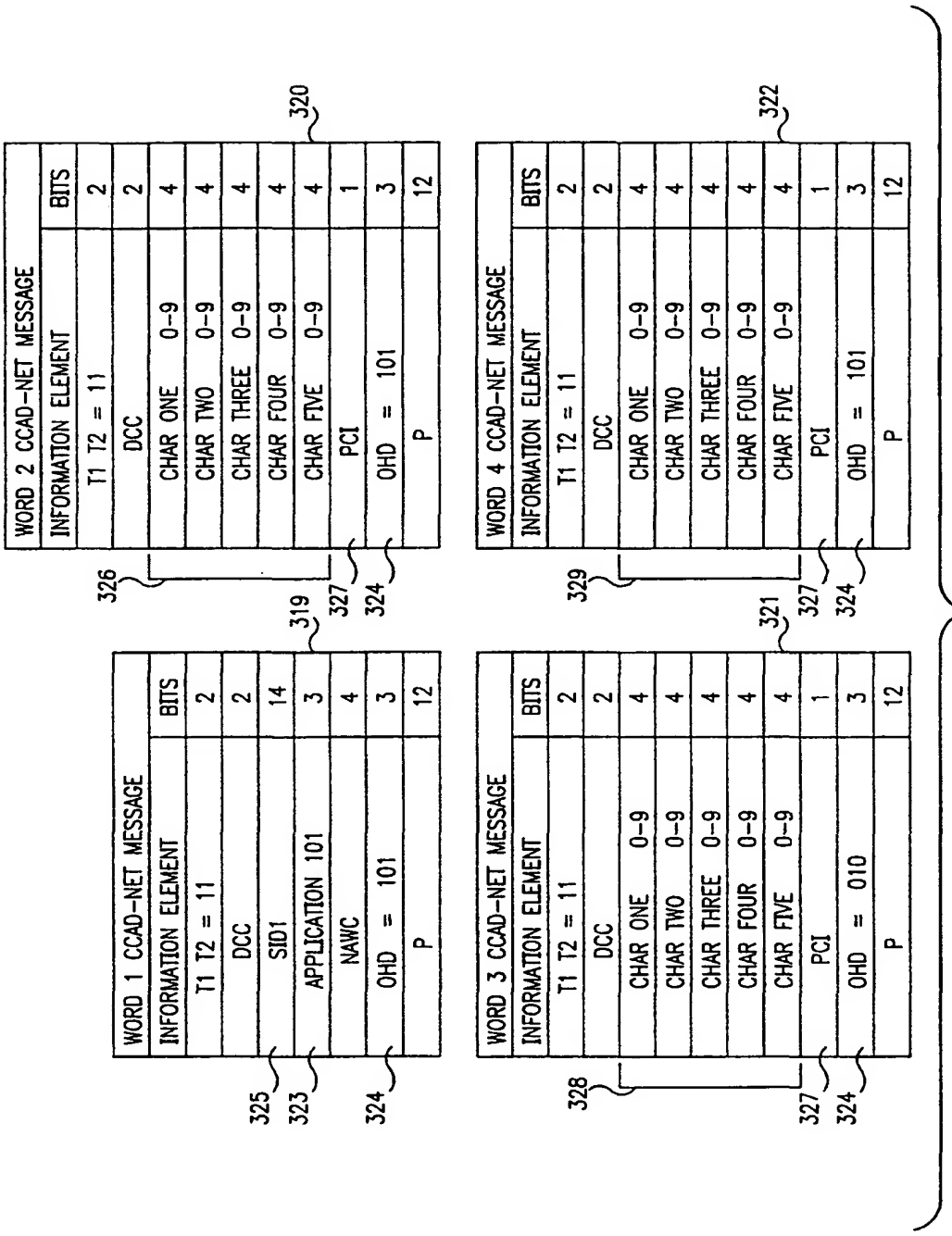

WORD 1 CCAD-NET MESSAGE
INFORMATION ELEMENT
BITS
T1 T2 = 11
2
DCC
2
SID1
14
APPLICATION 101
3
NAWC
4
OHD = 101
3
P
12
325
323
324
319
WORD 2 CCAD-NET MESSAGE
INFORMATION ELEMENT
BITS
T1 T2 = 11
2
DCC
2
CHAR ONE 0-9
4
CHAR TWO 0-9
4
CHAR THREE 0-9
4
CHAR FOUR 0-9
4
CHAR FIVE 0-9
4
PCI
1
OHD = 101
3
P
12
326
327
324
320
WORD 3 CCAD-NET MESSAGE
INFORMATION ELEMENT
BITS
T1 T2 = 11
2
DCC
2
CHAR ONE 0-9
4
CHAR TWO 0-9
4
CHAR THREE 0-9
4
CHAR FOUR 0-9
4
CHAR FIVE 0-9
4
PCI
1
OHD = 010
3
P
12
328
327
324
321
WORD 4 CCAD-NET MESSAGE
INFORMATION ELEMENT
BITS
T1 T2 = 11
2
DCC
2
CHAR ONE 0-9
4
CHAR TWO 0-9
4
CHAR THREE 0-9
4
CHAR FOUR 0-9
4
CHAR FIVE 0-9
4
PCI
1
OHD = 101
3
P
12
329
327
324
322

FIG. 12

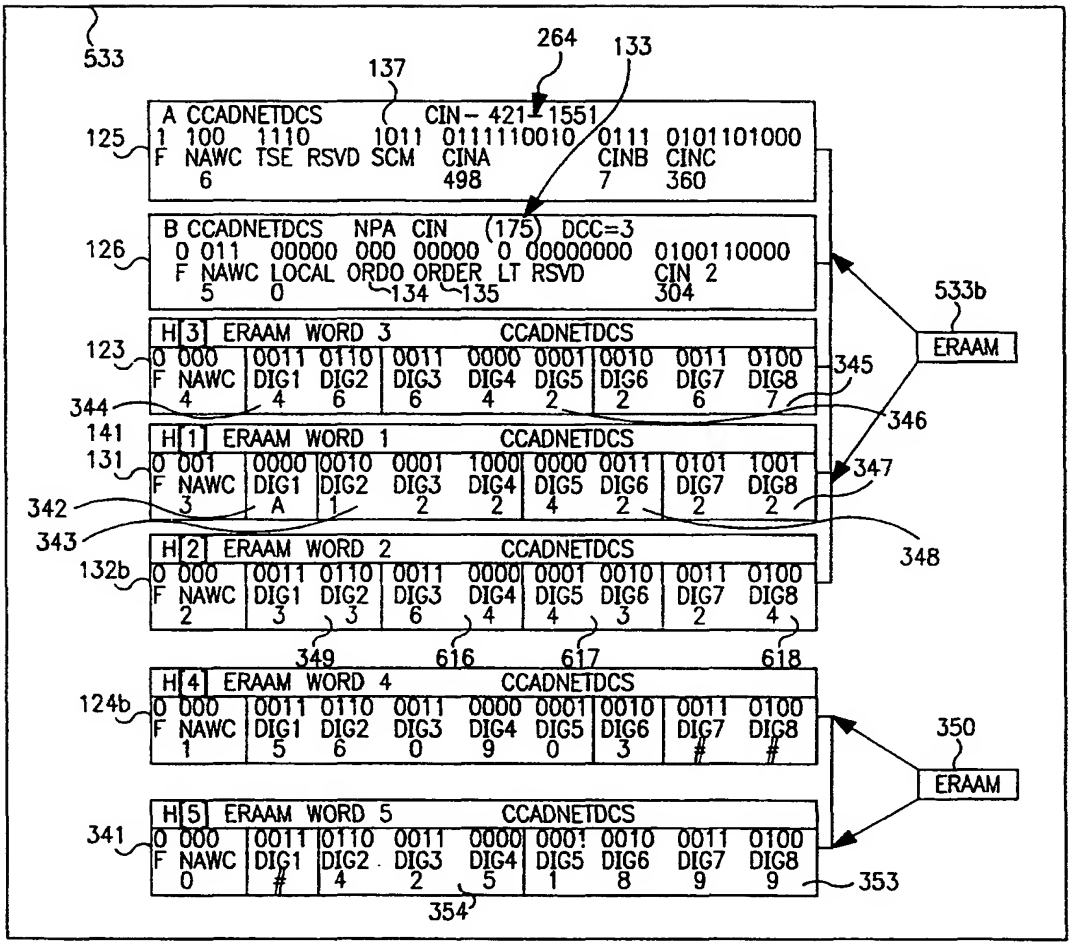

533
264
133
137
A CCADNETDCS CIN- 421 1551
125
1 100 1110 1011 0111110010 0111 0101101000
F NAWC TSE RSVD SCM CINA CINB CINC
6 498 7 360
B CCADNETDCS NPA CIN (175) DCC=3
126
0 011 00000 000 00000 0 00000000 0100110000
F NAWC LOCAL ORDO ORDER LT RSVD CIN 2
5 0 134 135 304
533b
ERAAM
H 3 ERAAM WORD 3 CCADNETDCS
123
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
4 4 6 6 4 2 2 6 7
345
344
346
141
H 1 ERAAM WORD 1 CCADNETDCS
131
0 001 0000 0010 0001 1000 0000 0011 0101 1001
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
3 A 1 2 2 4 2 2 2
347
342
343
348
H 2 ERAAM WORD 2 CCADNETDCS
132b
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
2 3 3 6 4 4 3 2 4
349 616 617 618
H 4 ERAAM WORD 4 CCADNETDCS
124b
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
1 5 6 0 9 0 3 # #
350
ERAAM
H 5 ERAAM WORD 5 CCADNETDCS
341
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
0 # 4 2 5 1 8 9 9
353
354

FIG. 13

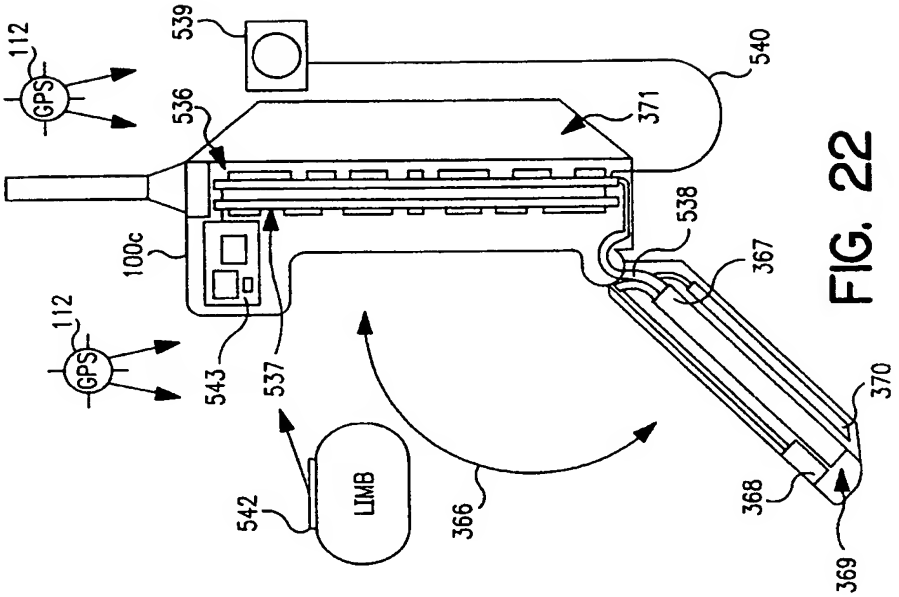

112
GPS
539
536
540
371
538
100c
367
112
GPS
543
537
542
LIMB
366
370
368
369

FIG. 22

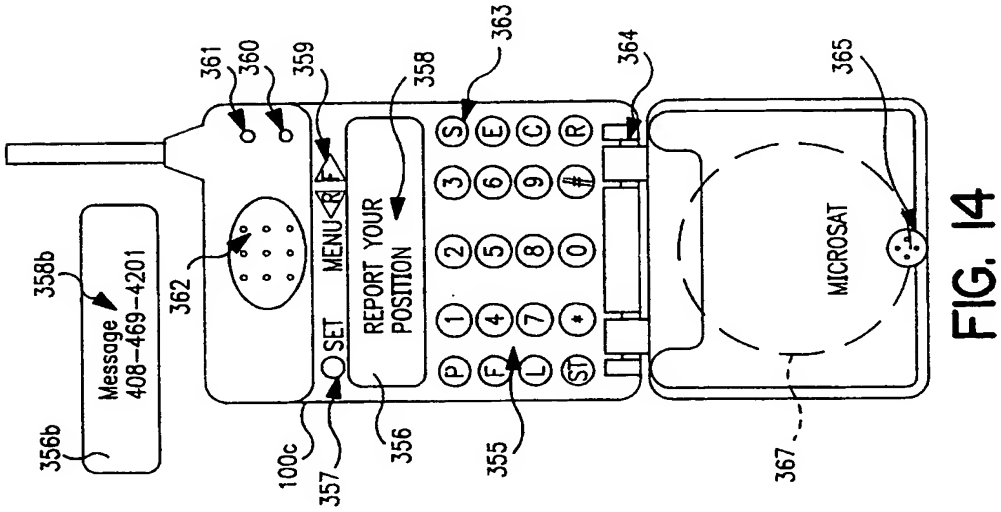

361
360
359
358
363
364
365
358b
Message
408-469-4201
362
SET
MENU
REPORT YOUR
POSITION
MICROSAT
356b
100c
357
356
355
367

FIG. 14

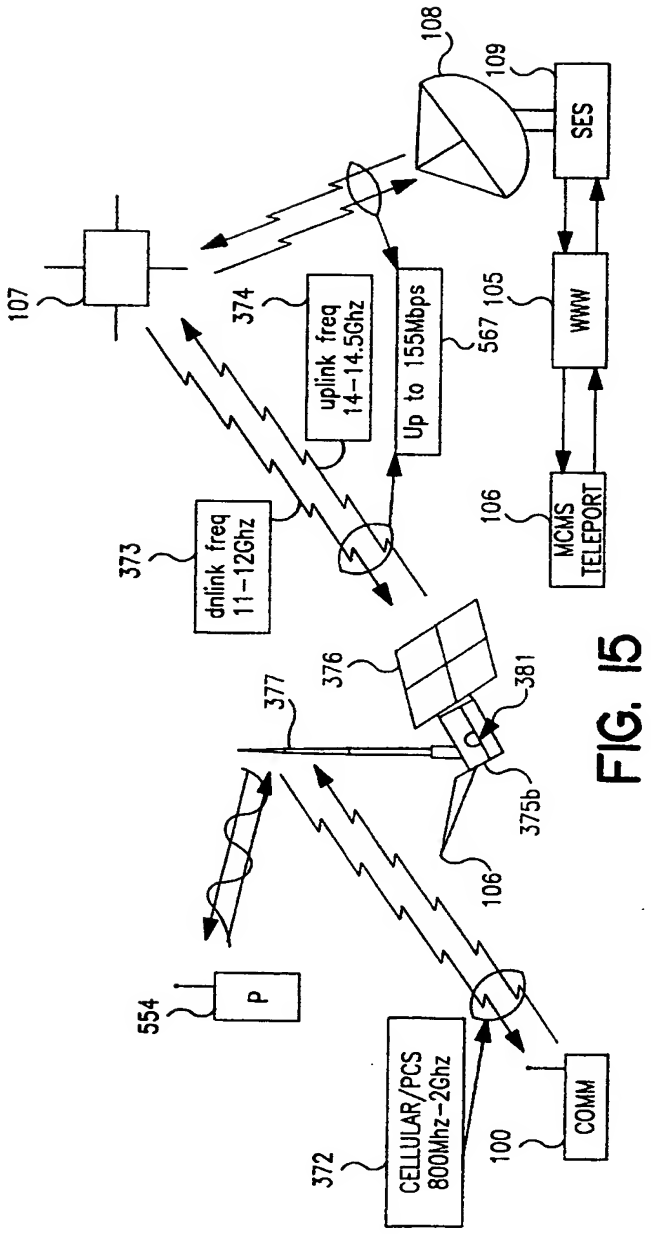


FIG. 15

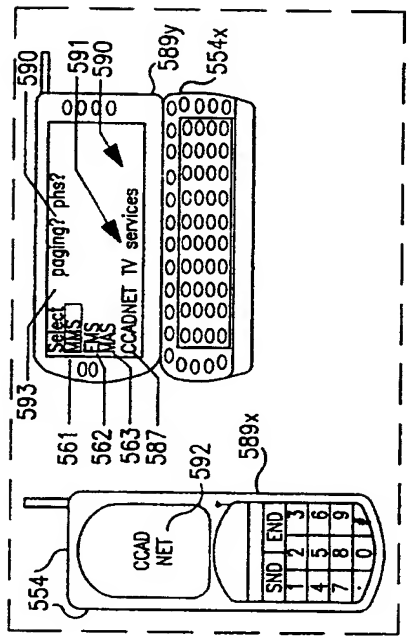


FIG. 25

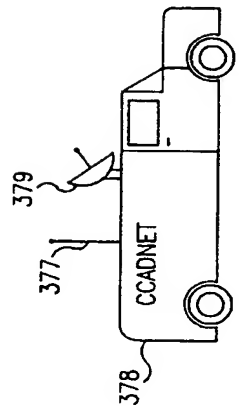


FIG. 16

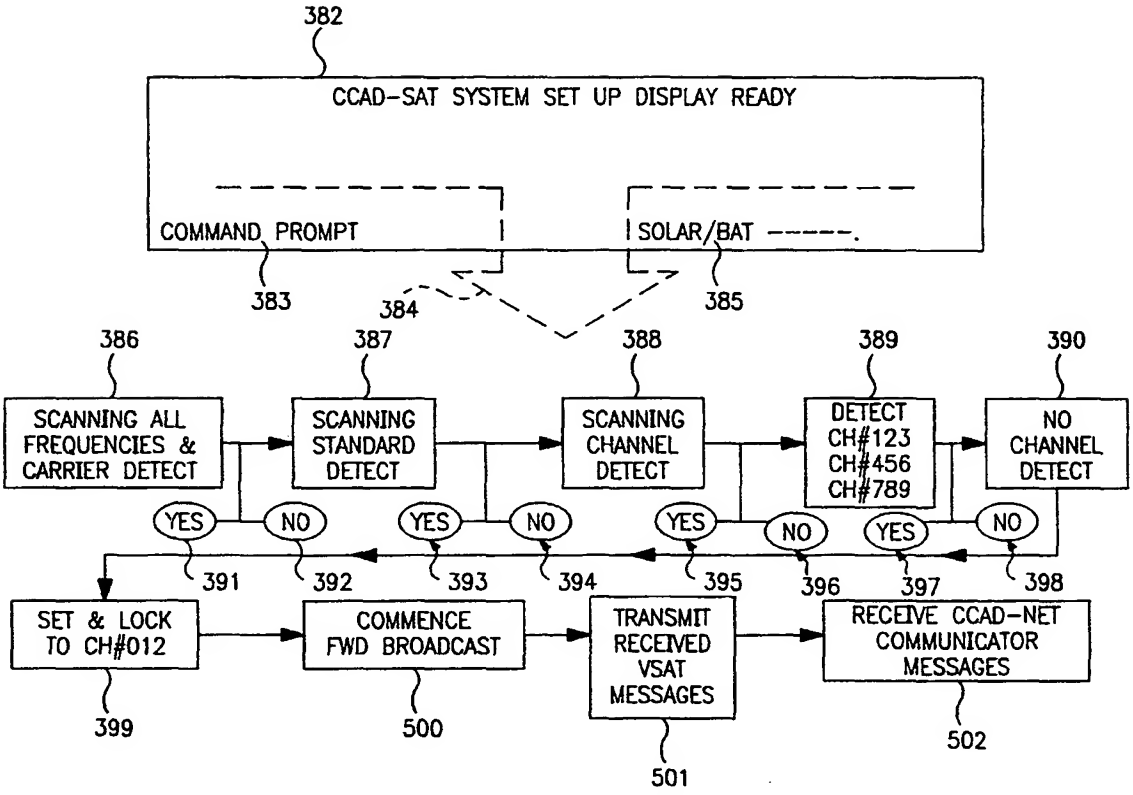

382
CCAD-SAT SYSTEM SET UP DISPLAY READY
COMMAND PROMPT
SOLAR/BAT
383
384
385
386
387
388
389
390
SCANNING ALL FREQUENCIES & CARRIER DETECT
SCANNING STANDARD DETECT
SCANNING CHANNEL DETECT
DETECT CH#123 CH#456 CH#789
NO CHANNEL DETECT
YES
NO
YES
NO
YES
NO
YES
NO
391
392
393
394
395
396
397
398
SET & LOCK TO CH#012
COMMENCE FWD BROADCAST
TRANSMIT RECEIVED VSAT MESSAGES
RECEIVE CCAD-NET COMMUNICATOR MESSAGES
399
500
501
502

FIG. 17

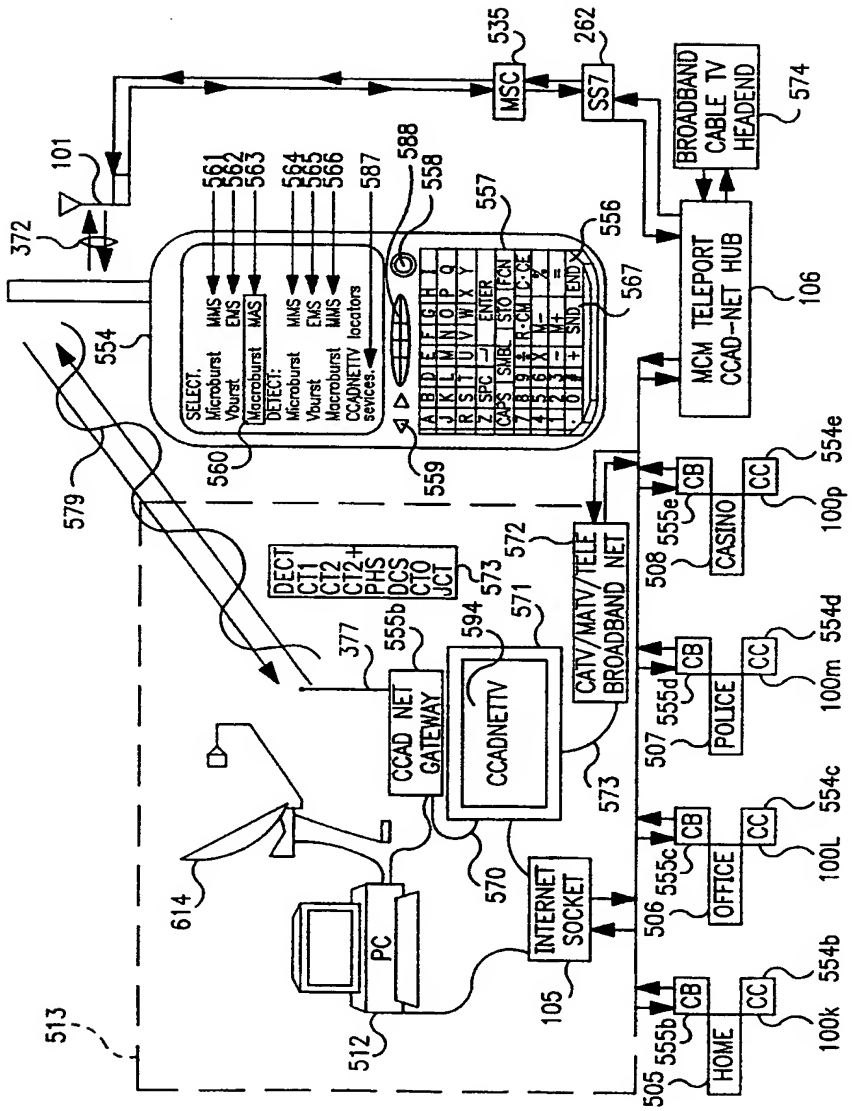

MSC
SS7
BROADBAND CABLE TV HEADEND
MCM TELEPORT CCAD-NET HUB
CATV/MATV/TELE BROADBAND NET
CCAD NET GATEWAY
CCADNETTV
INTERNET SOCKET
PC
DECT CT1 CT2 CT2+ PHS DCS CTO JCT
CASINO
POLICE
OFFICE
HOME
SELECT:
DETECT:
Microburst
Vburst
Macroburst
CCADNETTV sevices.
MMS
EMS
MAS
locations
ENTER
SND
END
101
372
554
579
614
513
512
105
506
507
508
505
560
559
557
556
567
588
558
561
562
563
564
565
566
587
572
573
571
594
377
555b
570
555e
555d
555c
555b
554e
554d
554c
554b
100p
100m
100L
100k
574
106
535
262

FIG. 18

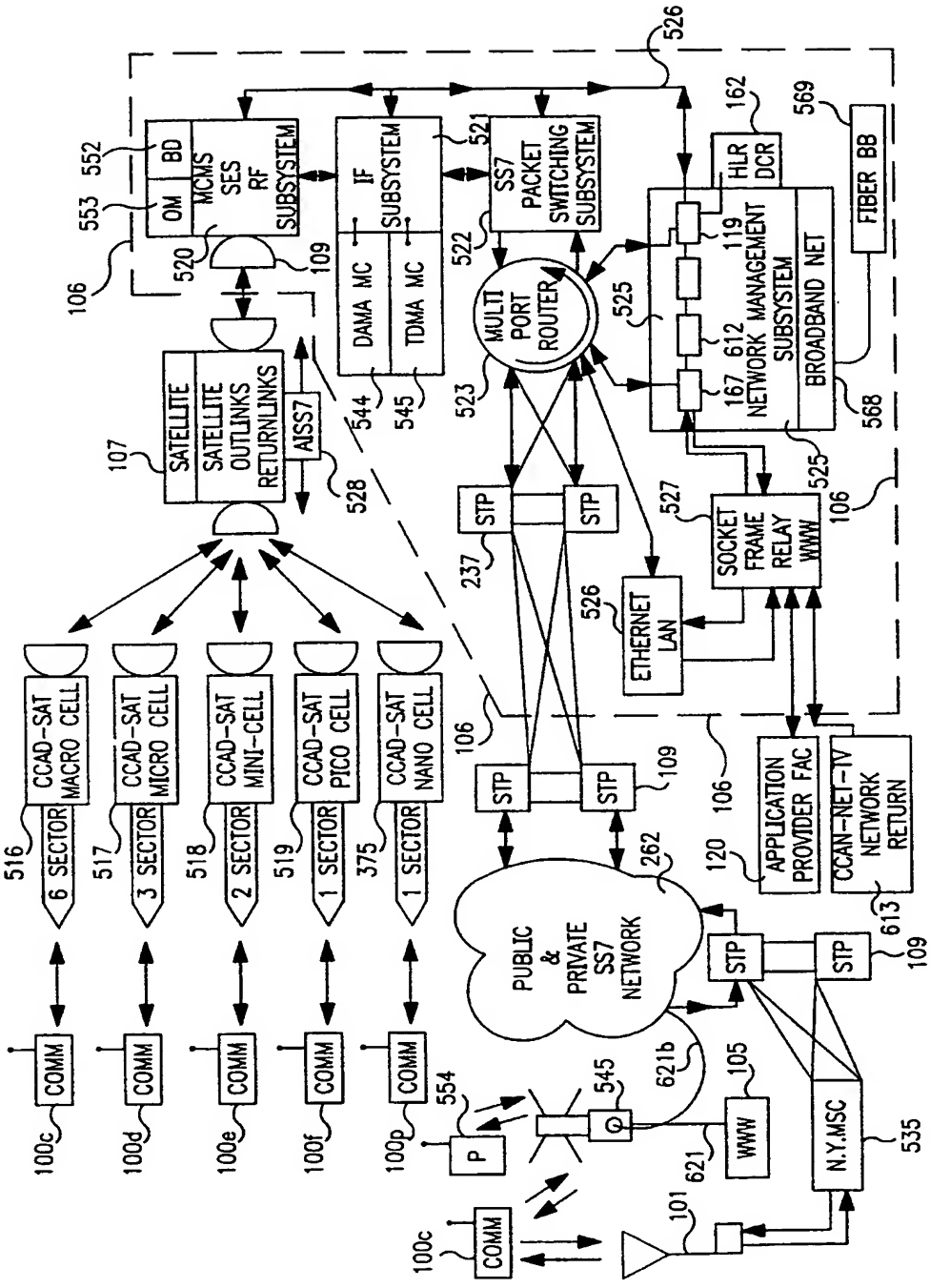

526
552
553
106
520
109
BD
OM
MCMS
SES
RF
SUBSYSTEM
IF
SUBSYSTEM
DAMA MC
TDMA MC
521
SS7
PACKET
SWITCHING
SUBSYSTEM
522
MULTI
PORT
ROUTER
523
525
162
HLR
DCR
569
FIBER BB
119
612
167
NETWORK MANAGEMENT
SUBSYSTEM
BROADBAND NET
568
107
SATELLITE
SATELLITE
OUTLINKS
RETURNLINKS
AISS7
528
544
545
STP
237
527
SOCKET
FRAME
RELAY
WWW
525
106
526
ETHERNET
LAN
CCAD-SAT
MACRO CELL
6 SECTOR
516
CCAD-SAT
MICRO CELL
3 SECTOR
517
CCAD-SAT
MINI-CELL
2 SECTOR
518
CCAD-SAT
PICO CELL
1 SECTOR
519
CCAD-SAT
NANO CELL
1 SECTOR
375
106
109
120
APPLICATION
PROVIDER FAC
CCAN-NET-TV
NETWORK
RETURN
613
262
PUBLIC
&
PRIVATE
SS7
NETWORK
621b
105
554
545
P
Q
WWW
621
N.Y.MSC
535
101
COMM
100c
100d
100e
100f
100p

FIG. 19

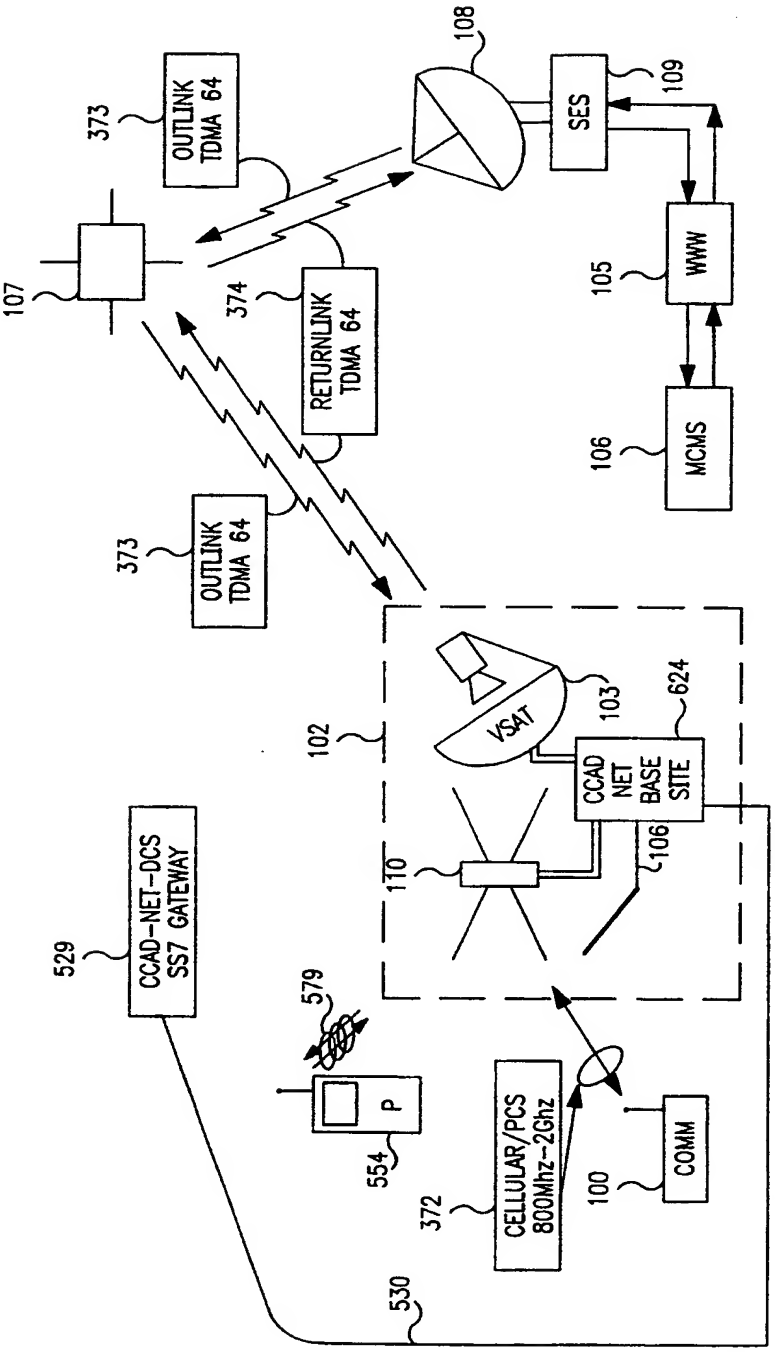
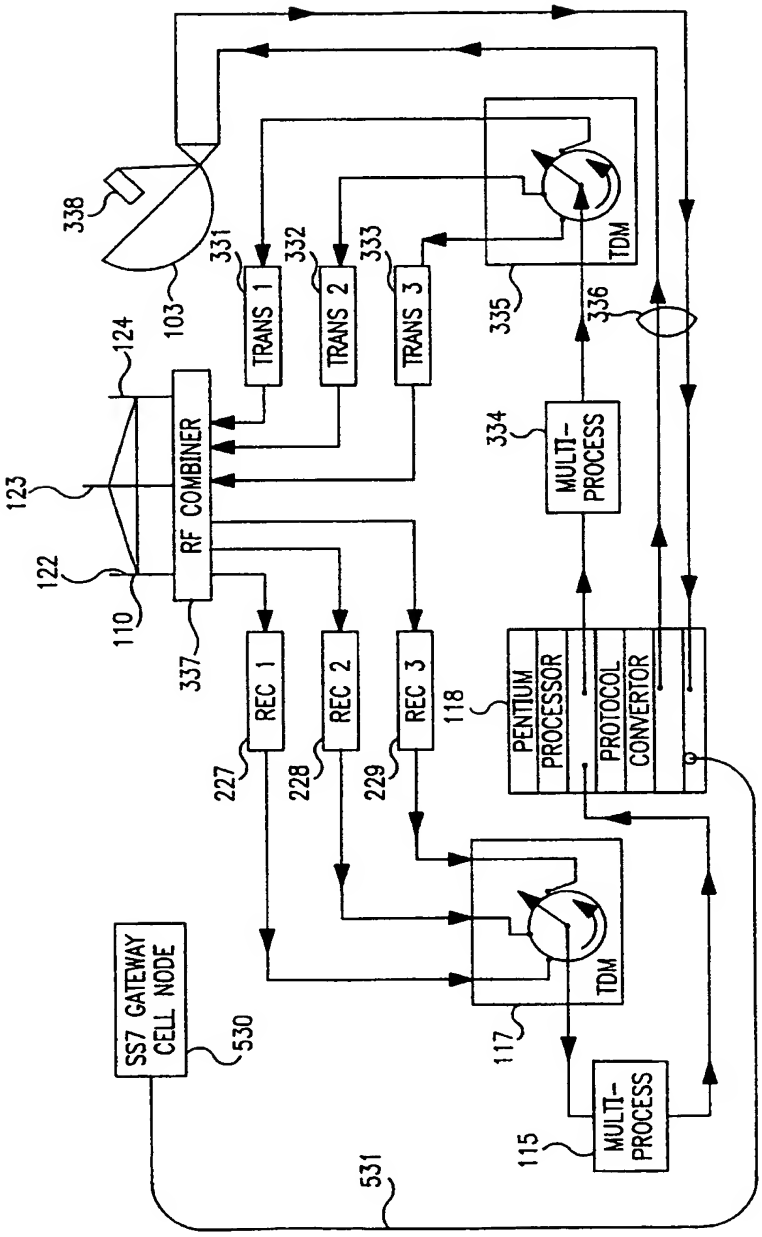

108
SES
109
373
OUTLINK TDMA 64
107
374
RETURNLINK TDMA 64
105
WWW
106
MCMS
373
OUTLINK TDMA 64
102
VSAT
103
624
CCAD NET BASE SITE
106
110
529
CCAD-NET-DCS SS7 GATEWAY
579
P
554
372
CELLULAR/PCS 800Mhz-2Ghz
100
COMM
530

FIG. 20

FIG. 21


338
103
124
123
122
110
337
331
332
333
TRANS 1
TRANS 2
TRANS 3
RF COMBINER
REC 1
REC 2
REC 3
227
228
229
118
335
336
TDM
334
MULTI-PROCESS
PENTIUM PROCESSOR
PROTOCOL CONVERTOR
TDM
117
115
MULTI-PROCESS
SS7 GATEWAY CELL NODE
530
531

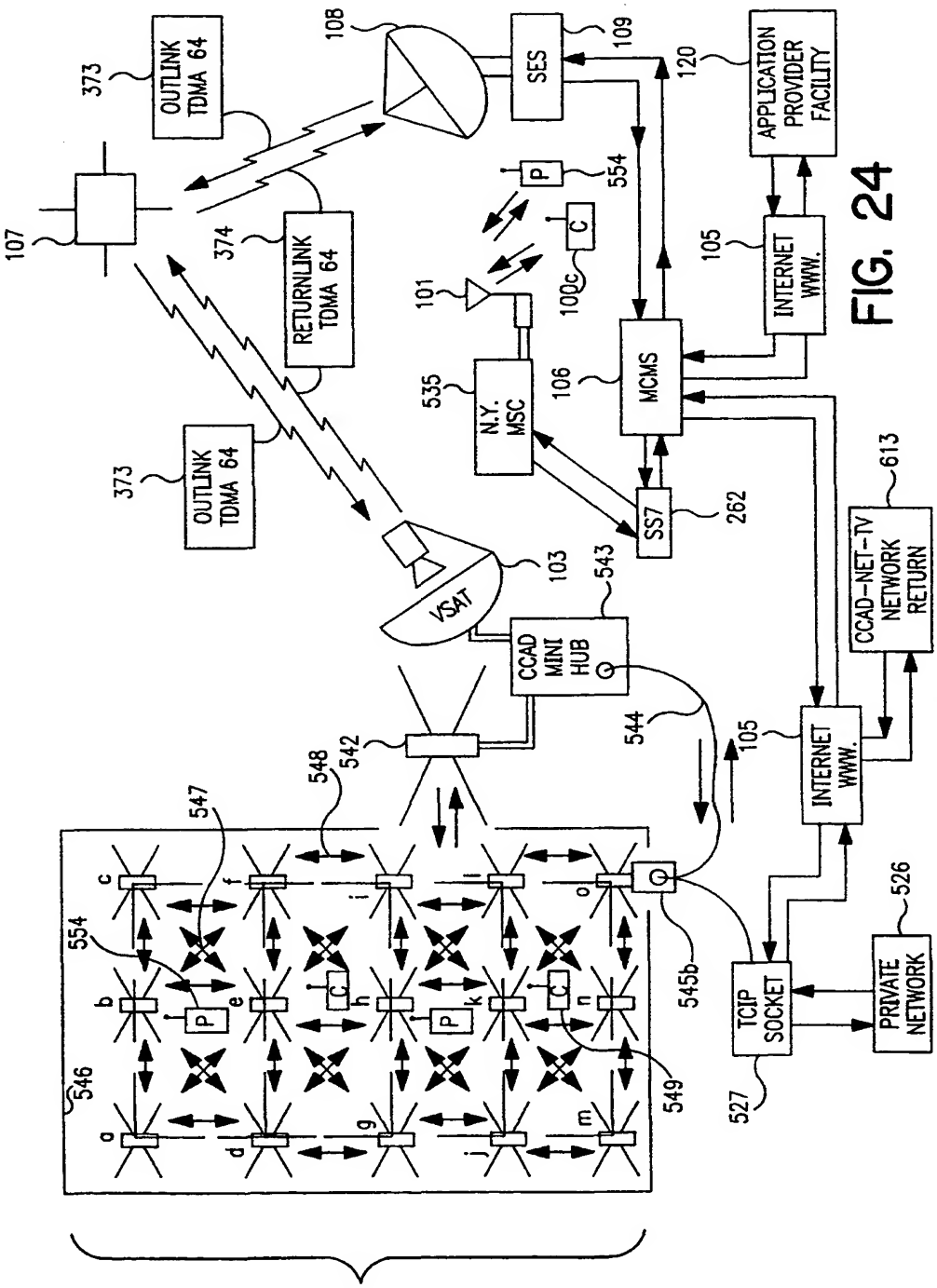

OUTLINK TDMA 64
373
108
SES
109
120
APPLICATION PROVIDER FACILITY
554
P
C
100c
101
107
374
RETURNLINK TDMA 64
105
INTERNET WWW.
535
N.Y. MSC
106
MCMS
373
OUTLINK TDMA 64
SS7
262
613
CCAD-NET-TV NETWORK RETURN
VSAT
103
543
CCAD MINI HUB
544
548
542
547
546
549
545b
526
TCIP SOCKET
PRIVATE NETWORK
527

FIG. 23

FIG. 24

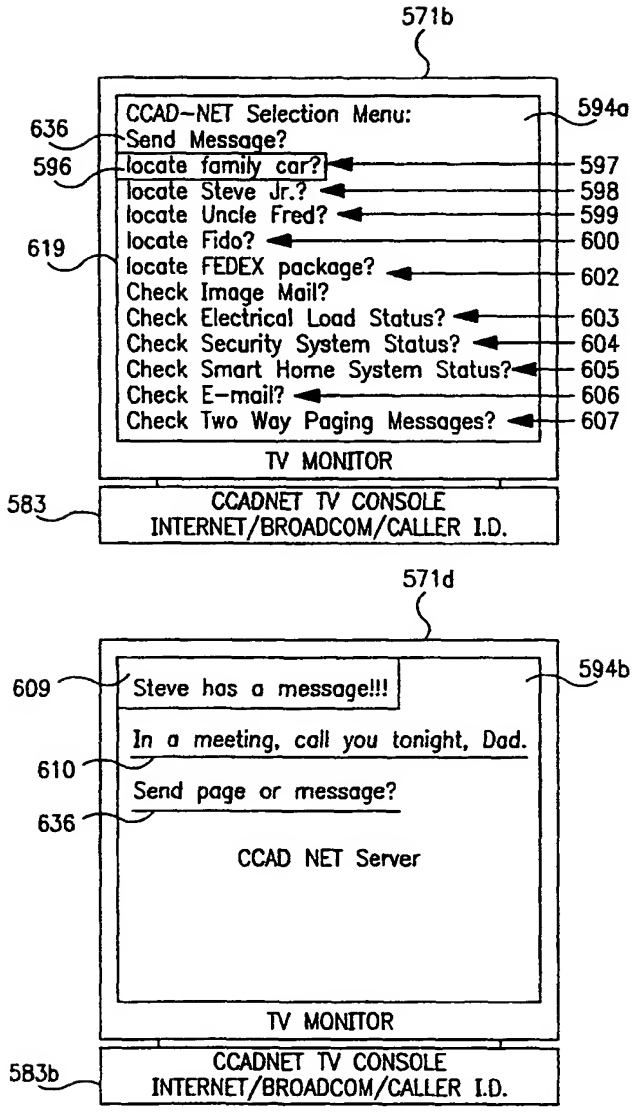

571b
CCAD-NET Selection Menu:
Send Message?
locate family car?
locate Steve Jr.?
locate Uncle Fred?
locate Fido?
locate FEDEX package?
Check Image Mail?
Check Electrical Load Status?
Check Security System Status?
Check Smart Home System Status?
Check E-mail?
Check Two Way Paging Messages?
TV MONITOR
CCADNET TV CONSOLE
INTERNET/BROADCOM/CALLER I.D.
636
596
619
583
594a
597
598
599
600
602
603
604
605
606
607
571d
Steve has a message!!!
In a meeting, call you tonight, Dad.
Send page or message?
CCAD NET Server
TV MONITOR
CCADNET TV CONSOLE
INTERNET/BROADCOM/CALLER I.D.
609
610
636
583b
594b

FIG. 26A

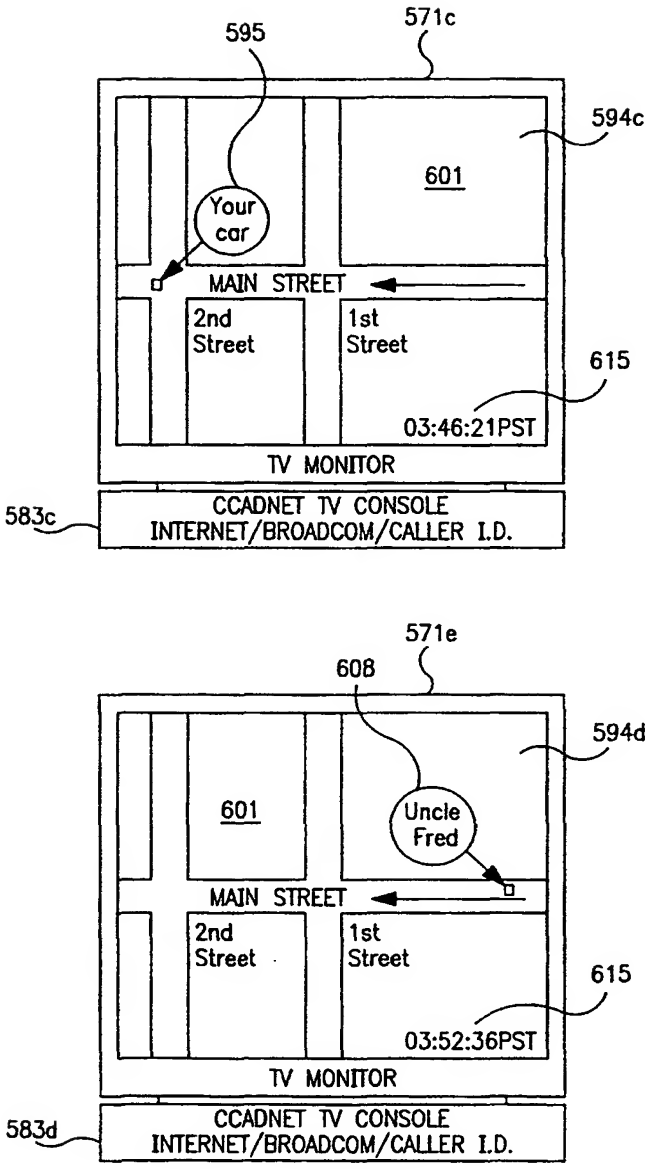

595
571c
594c
601
Your car
MAIN STREET
2nd Street
1st Street
615
03:46:21PST
TV MONITOR
583c
CCADNET TV CONSOLE
INTERNET/BROADCOM/CALLER I.D.
571e
608
594d
601
Uncle Fred
MAIN STREET
2nd Street
1st Street
615
03:52:36PST
TV MONITOR
583d
CCADNET TV CONSOLE
INTERNET/BROADCOM/CALLER I.D.

FIG. 26B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/04638

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) : H04Q 7/20, 7/22,7/00
US CL : 455/414, 427, 12.1,13.1 426, 403, 550, 551
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 455/414, 427, 12.1,13.1 426, 403, 550, 551

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
YP	US 5,841,854 A (SCHUMACHER et al.) 24 November 1998, title, col. 2 lines 50-55, col. 10 lines 46-54.	22,23,27
Y	US 5,568,535 A (SHEFFER et al.) 22 October 1996, abstract.	24,25

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 06 MAY 1999	Date of mailing of the international search report 01 JUN 1999
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer KEITH FERGUSON James R. Matthews Telephone No. (703) 305-4888

Form PCT/ISA/210 (second sheet)(July 1992)*